

# Cystic Fibrosis Research News

**Title:**

Cystic fibrosis-related diabetes (CFRD) and cognitive function in adults with cystic fibrosis

**Lay Title:**

Cystic fibrosis-related diabetes (CFRD) and cognitive ability (memory, attention and task switching) in adults with cystic fibrosis

**Authors:**

Helen K Chadwick<sup>a, b, c</sup>, Janice Abbott<sup>d</sup>, Margaret Anne Hurley<sup>e</sup>, Louise Dye<sup>a</sup>,  
Clare L Lawton<sup>a</sup>, Michael W Mansfield<sup>f</sup>, Daniel Peckham<sup>b, c</sup>

**Affiliations:**

<sup>a</sup> School of Psychology, University of Leeds, Leeds, LS2 9JT, UK

<sup>b</sup> Leeds Institute of Medical Research at St James's, University of Leeds, Leeds, LS2 9JT, UK

<sup>c</sup> Adult Cystic Fibrosis Unit, St James's University Hospital, Leeds Teaching Hospitals NHS Trust, Leeds, LS9 7TF, United Kingdom

<sup>d</sup> School of Psychology, University of Central Lancashire, Preston, PR1 2HE, UK

<sup>e</sup> Faculty of Health and Wellbeing, University of Central Lancashire, Preston, PR1 2HE, UK

<sup>f</sup> Leeds Centre for Diabetes and Endocrinology, St James's University Hospital, Leeds Teaching Hospitals NHS Trust, Leeds, LS9 7TF, UK

**What was your research question?**

Using touch-screen computerised tests, we investigated whether there were any differences in memory, attention and the ability to switch easily between two tasks, in people with cystic fibrosis (CF) with and without cystic fibrosis-related diabetes (CFRD) and healthy controls (people without any medical condition).

**Why is this important?**

Diabetes has been shown to cause changes in the brain. Previous research has shown that people with prediabetes, type 1 and type 2 diabetes experience problems with cognitive ability (e.g. memory, attention and the ability to easily switch between two tasks). Cystic fibrosis-related diabetes (CFRD) is not type 1 or 2 diabetes, but has features of both. However, it was unknown if people with CFRD also experience any difficulties in cognitive (mental) ability, which may interfere with self-care, disease management and performing everyday tasks.

# Cystic Fibrosis Research News

## What did you do?

We recruited 98 people with CF (49 without diabetes, 49 with CFRD) from the Leeds Adult CF Regional Centre and 49 healthy controls from the general population. Participants attended one testing session, where they had their blood sugar and carbon monoxide concentration measured, completed several short questionnaires (health, sleep, anxiety and depression) and 7 touch-screen computer tests of memory, attention and task switching ability from the Cambridge Neuropsychological Test Automated Battery (CANTAB). Upon completion they received a £10 Love2Shop voucher as a payment.

## What did you find?

We found that people with CF did not perform as well on tests of memory (remembering a list of 18 words, locating different hidden patterns, remembering the order of boxes changing colour), attention (accuracy of finding number sequences in a fast-paced test) and task switching ability (accuracy and speed when switching between two tasks), compared with healthy controls. Those with CFRD experienced more difficulties. Compared with healthy controls, people with CF with and without diabetes had an estimated up to 40% and 20% reduction in their ability to quickly process information respectively.

## What does this mean and reasons for caution?

CF is a complex, multi-treatment disease and the difficulties may be sufficient to interfere with self-care and disease management. The ability to perform everyday tasks may require more effort in those with CF compared to healthy peers.

Previous research has shown that accuracy and the ability to quickly process information are negatively affected during pulmonary flare-ups. In this study, although 44 people with CF were on intravenous antibiotics, 32 were receiving elective 'maintenance antibiotics'. For those with a pulmonary flare-up as the reason, 10 patients were tested at either mid or end of their treatment to minimise the negative effects.

## What's next?

Cognitive ability (e.g. memory, attention) is an aspect of quality of life that has largely gone unnoticed in CF. The suggestion that ivacaftor therapy may improve cognitive ability is remarkable and provides a rationale for considering cognitive ability as an additional outcome measure for future 'CFTR modulator' clinical trials.

## Original manuscript citation in PubMed

NA 6 Jun. 21