**Title:** Lung clearance index in patients with cystic fibrosis: Can we avoid repeating the test three times?

**Lay Title:** Can we shorten test time for Lung Clearance Index (a lung function test used in CF)?

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**What was your research question?**

Can we get the same information from repeating the Lung Clearance Index (LCI) test just two times, instead of the standard requirement for three repeats?

**Why is this important?**

LCI is increasingly used to assess CF lung disease, and is particularly helpful in children and adults with good lungs. But it takes time to complete, and is more lengthy than just doing spirometry (standard lung function), which makes it hard to complete in a busy clinic. If we can get the same result with two tests as we do with three, this will significantly shorten the total test time, and make it easier to carry out in clinics. Having LCI available will help with long term monitoring of CF, since it is more sensitive to early changes than spirometry.

**What did you do?**

We looked at a large number of LCI tests from a previous study and compared the average of the first two test repeats to the average obtained from using all three repeats. We then looked at how close test 1 and test 2 were to each other, to try to identify if there were features of these results that would tell us if we should do a third test, or could reassure us that we didn’t need to.

**What did you find?**

Overall the results from using two repeats were very similar to that from using three repeats, so we are confident that in most cases a third test is not needed. This was regardless of how close test one and two were to each other. Each LCI repeat takes 5-10 minutes, so cutting one of these out could be a big time saving.

**What does this mean and reasons for caution?**

If a patient can complete two good quality tests then there is no need to carry out a third measurement, and the test session can finish at that point. The catch is that in order to know this, currently we manually inspect the test tracing to check that it has been carried out to quality standards. This is usually done after the session has finished, which is the reason why we aim for three repeats (so that if we have to discard one we still have two tests we can use). For this to work in real life, we need the device software to automatically assess quality as well as results.

**What’s next?**

We are sharing these findings with LCI device manufacturers and incorporating into new guidelines. If manufacturers build automated quality checking into their devices, it will make LCI much quicker to deliver. This will make a big difference when we deliver LCI alongside routine clinic appointments.

**Original manuscript citation in PubMed**

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