

# Cystic Fibrosis Research News

## Title:

A TWO-CENTER ANALYSIS OF HYPERPOLARIZED 129XE LUNG MRI IN STABLE PEDIATRIC CYSTIC FIBROSIS: POTENTIAL AS A BIOMARKER FOR MULTI-SITE TRIALS

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## What was your research question?

Xenon magnetic resonance imaging (MRI) is a technique that can visualize xenon gas that has been inhaled into the lungs. Healthy individuals have a bright signal throughout the lungs, whereas patients with lung disease have a patchy image that represents uneven ventilation. This technique can be used to reveal changes in lung function, particularly small changes in very early cystic fibrosis lung disease. We asked whether xenon MRI provides similar lung function measurements when applied at two hospitals.

## Why is this important?

Xenon MRI provides more information than traditional breathing tests, since it identifies specific regions of the lung that are not functional. In addition, xenon MRI is a safe technique that does not use radiation. Xenon MRI is currently a research technique that is being prepared for future clinical approval. Therefore, research sites are coordinating efforts to standardize the technique and compare image quality.

## What did you do?

We retrospectively analysed traditional breathing tests and xenon MRI performed on 26 children from two institutions, including 18 with cystic fibrosis and 8 healthy controls. In each image, we measured the fraction of lung that was not functional, defined as the ventilation defect percentage. To ensure accuracy, two trained analysts from our laboratory analysed

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each image to calculate the ventilation defect percentage. Finally, we compared the xenon MRI ventilation defect percentage between healthy and cystic fibrosis subjects and compared to results obtained using traditional breathing tests.

## What did you find?

As expected, the xenon MRI ventilation defect percentage was greater in children with cystic fibrosis, compared to the healthy controls. The ventilation defect percentage was similar in the two groups of cystic fibrosis patients that were scanned at the two institutions. These results were confirmed by both of the trained analysts. The ventilation defect percentage strongly agreed with traditional breathing tests, and this agreement improved when measurements from both institutions were combined.

## What does this mean and reasons for caution?

Xenon MRI is a useful tool for measuring lung function in children with cystic fibrosis. Unlike traditional breathing tests, xenon MRI provides the added advantage of identifying the non-functional regions of the lung. As this study was a retrospective analysis of previously acquired data, there were some differences in the MRI techniques used at the two institutions. Therefore, future prospective studies will focus on standardizing the acquisitions so that images from each institution can be analysed fairly.

## What's next?

Since the xenon MRI defect percentage measurements performed at two institutions provided similar results, we propose this technique can be used for future multi-center clinical trials of new cystic fibrosis treatments.

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