radiation exposures afforded by technological advances.

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REFERENCES
1 Hochhegger B, Itaon K, Marchiori E. Chest MRI in
patients with cystic fibrosis: a radiation-free method.
Thorax 2012; doi: 10.1136/thoraxjnl-2012-202332.
2 Mott LS, Park J, Murray CP, et al. Progression of
early structural lung disease in young children with
cystic fibrosis assessed using CT. Thorax
3 Mahesh M. Advances in CT technology and
application to pediatric imaging. Pediatr Radiol
Assessment of morphological MRI for pulmonary
changes in cystic fibrosis (CF) patients: comparison to
thin-section CT and chest x-ray. Invest Radiol
5 McMahon CJ, Dodd JD, Hill C, et al. Hyperpolarized
helium magnetic resonance ventilation imaging of
the lung in cystic fibrosis: comparison with high
resolution CT and spirometry. Eur Radiol
2006;16:2483–90.
6 Tiddens HA, Donaldson SH, Rosenfeld M, et al. Cystic
fibrosis lung disease starts in the small airways: can
we treat it more effectively? Pediatr Pulmonol
7 Eichinger M, Optazaite DE, Kopp-Schneider A, et al.
Morphologic and functional scoring of cystic fibrosis
8 Eichinger M, Heussel CP, Kauczor HU, et al.
Computed tomography and magnetic resonance
imaging in cystic fibrosis lung disease. J Magn Reson
appearance of cystic fibrosis: comparison to CT. Eur

Authors’ response

We thank Hochhegger, Itaon and Marchiori for their interest in our manuscript. We agree that cumulative radiation dose exposures from chest computed tomography (CT) could be a limiting factor for the use of frequent scans in children with cystic fibrosis, although continuous advances in CT technology are allowing comprehensive assessments of lung structure with increasingly smaller radiation exposures. The authors suggest that lung magnetic resonance imaging (MRI) may be an emerging modality with improving temporal and spatial resolution, stating that previous studies demonstrate that MRI is comparable with CT for the detection of structural changes. In fact, these studies were conducted in older children and adults with established structural disease, rather than in infants and young children in whom the earliest changes in lung structure occur. As the earliest structural changes due to cystic fibrosis appear to develop in the peripheral Airways, a region of the lung that is poorly characterised by lung MRI, both by direct assessment of small airways and indirectly by air trapping, the relatively poor ability of lung MRI to accurately assess the peripheral airways is likely to limit its use for assessing airways disease in young children or in mild disease. While lung MRI has an additional ability to assess functional changes, the importance of these in early childhood is not clear. Therefore, at present, the role of lung MRI in assessing mild structural changes due to cystic fibrosis seen in early childhood is uncertain and until lung MRI is established as a feasible and appropriate assessment tool for early structural lung disease, chest CT remains the gold standard in this population, particularly when acknowledging the reducing.