Cystic Fibrosis Research News

Title:
Lung function and secondhand smoke exposure among children with cystic fibrosis: A Bayesian meta-analysis

Lay Title:
Understanding the relationship between secondhand smoke exposure and lung function in children with cystic fibrosis

Authors:
Jack Reifenberg[a], Emrah Gecili[b,f], Teresa Pestian[c], Eleni-Rosalina Andrinopoulou[d,e], Patrick H. Ryan[b,f], Cole Brokamp[b,f], Joseph M. Collaco[g], Rhonda D. Szczesniak[b,f,h,]

Affiliations:
[a]University of Cincinnati, Cincinnati, OH, USA
[b]Division of Biostatistics & Epidemiology, Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA
[c]Department of Anesthesia, Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA
[d]Department of Biostatistics, Erasmus Medical Center, Rotterdam, The Netherlands
[e]Department of Epidemiology, Erasmus Medical Center, Rotterdam, The Netherlands
[f]Department of Pediatrics, University of Cincinnati, Cincinnati, OH, USA
[g]Department of Pediatrics, Johns Hopkins University, Baltimore, MD
[h]Division of Pulmonary Medicine, Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA

What was your research question?
What insights can we learn if we are able to synthesize the numerous studies in CF about secondhand tobacco smoke exposure and changes in lung function?

Why is this important?
Much is known through single research studies about the harmful effects of secondhand smoke exposure on CF lung function. However, we have limited understanding when it comes to these effects pooled across multiple individual studies. Our research project uses a statistical approach to combine these multiple studies. We use it to estimate the severe impact of secondhand smoke exposure on change in lung function for children with CF. For

the first time, we have a pooled estimated impact that can be used for social work interventions and other strategies on smoking cessation.

What did you do?

We used what is called a Bayesian approach to perform a meta-analysis of all of the studies. At the same time, it allowed us to get a thorough understanding of the uncertainty around our effect estimate by looking at the distribution of the estimated effect. The approach also allowed us to understand how different the studies were, which is called heterogeneity. By accounting for heterogeneity, we were able to obtain a more accurate estimate of the pooled effect of secondhand smoke exposure on lung function changes in CF patients and improve the validity and generalizability of our findings.

What did you find?

Across all studies, we found that secondhand smoke exposure corresponded to an additional reduction in lung function of 5.11% predicted, and the 95% credible interval (CI) around this estimate was -7.20 to -3.47% predicted. Having the CI completely below zero implied that there was statistical evidence of reduced lung function. We also found that the studies were heterogeneous (i.e., different from one another). The average difference in lung function between studies was 1.32% predicted, and the 95% CI was 0.05 to 4.26% predicted; the CI completely above zero told us that the differences between studies were statistically significant.

What does this mean and reasons for caution?

Children with CF exposed to secondhand smoke are at risk of reduced lung function, considering a broad group of studies and despite how heterogenous these studies are. Because of the limited number of studies, there could be confounding demographic or clinical factors that we were unable to account for. However, the studies included in our analysis cover a breadth of the CF population, since they include studies of patient registry data.

What's next?

Having a pooled estimate of the loss in lung function attributable to secondhand smoke exposure could lead to development of new or enhancement of existing intervention methods for social workers and other health professionals embedded in CF care teams.

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