

Cystic Fibrosis Research News

Citation:

Duan, L.L., Wang, X., Clancy, J.P., & Szczesniak, R. (2018). Joint Hierarchical Gaussian process model with application to personalized prediction in medical monitoring. *Stat*, 7(1). DOI: 10.1002/sta4.178. PMID: 29593867. PMCID: PMC5868980.

What was your research question? (50 words maximum)

We sought to develop a joint statistical model to better predict disease progression in individuals with CF, including future lung function and pulmonary exacerbations.

Why is this important? (100 words maximum)

By improving the predictive accuracy of statistical models of lung function decline and pulmonary exacerbation onset, we can provide medical professionals information on how to improve monitoring for disease progression.

What did you do? (100 words maximum)

Using data from the CF Foundation Patient Registry (CFFPR), we modeled longitudinal lung function (FEV1) and pulmonary exacerbation events together using two statistical models simultaneously.

What did you find? (100 words maximum)

We found that this joint model framework yielded more accurate predictions of FEV1 and time to pulmonary exacerbation compared to conventional modeling (where lung function and pulmonary exacerbations are treated separately).

What does this mean and reasons for caution? (100 words maximum)

Our results suggest that joint statistical modeling may provide one method of more accurate prediction. Due to computer constraints, the models were implemented for a small set of the CFFPR data. Additional work is needed to gain computer speed for these models, in order to use the methods on a larger set of CFFPR data.

What's next? (50 words maximum)



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We have developed a model with greater computer efficiency and are currently drafting a manuscript for this data. Our applications show that this model is able to estimate parameters given the larger set of CFFPR data with enough computer speed.