



Cystic Fibrosis Research News

Title:

Changes in factors associated with inhaled antibiotic prescriptions for people with cystic fibrosis over time in the U.S.

Lay Title:

How have prescriptions for inhaled antibiotics changed in recent years in the U.S.

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What was your research question?

We wanted to see how often inhaled antibiotics are prescribed based on *Pseudomonas* infection status i.e. for people with CF with chronic infection compared to intermittent infection or those without *Pseudomonas* positive cultures. We also studied which other clinical factors may affect prescription and if those prescriptions changed between 2011 and 2019.

Why is this important?

It is known that inhaled antibiotics are very effective against *Pseudomonas* but they require a lot of time to administer and can cause side effects. Therefore it is important to understand if prescriptions occur for those people who have the correct indication. Further, as clinical outcomes for many people with CF improved a lot even before introduction of triple-modulator therapy (Trikafta® or Kaftrio®), we need to understand the prescription patterns. Such knowledge can inform decisions on when to prescribe or stop in setting of *Pseudomonas* negative cultures and in the setting of triple modulator in the future.

What did you do?

We obtained data from the CF Patient Registry that has anonymous data on at least 95% of people with CF in the U.S. We analysed the data from 2011 to 2019 i.e. the time before changes in care due to COVID pandemic and before licensing of triple-modulators. First, we described frequencies of chronic, intermittent or no *Pseudomonas* infection across those years and what their age, disease severity and medications were. Second, we analysed which

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fraction of each group was prescribed inhaled antibiotics and which clinical characteristics and medications predicted the prescription of inhaled antibiotics. Finally, we modelled prescription factors over time.

What did you find?

Over time the rate of chronic *Pseudomonas* decreased substantially and rate of *Pseudomonas* negative increased with smaller decreases for intermittent *Pseudomonas* infection. Prescription of antibiotics increased to ~80% for people with chronic *Pseudomonas* but 20% of those without *Pseudomonas* infection in the last 2 years were prescribed inhaled antibiotics. Factors associated with prescription were pancreatic insufficiency, F508del mutation, and Hispanic ethnicity for all *Pseudomonas* groups. For the *Pseudomonas* negative group, African-Americans, and MRSA infection had higher prescription rates. Over time prescription odds decreased for MRSA, Hispanic ethnicity and those on ivacaftor.

What does this mean and reasons for caution?

Between 2011 and 2019, the average age for people with CF increased and rate of *Pseudomonas* infection decreased for all subsets of infection. Prescriptions of inhaled antibiotics are better aligned with the CF treatment guidelines with lower rates of prescription for those who have not cultured *Pseudomonas* in several years. Prescription for bacteria that are not considered responsive to inhaled antibiotics has decreased which is reassuring in regards to side effects such as presence of fungus. From the current data we cannot say too much on the effect that CFTR modulators may have on prescribing habits.

What's next?

We are working on similar analyses using the Canadian and European registries. We plan to submit another project request to study how use of triple-modulators has affected inhaled antibiotics. In that study we would also look at which clinical characteristics make it safe to discontinue the inhaled antibiotics.

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