Interviews

The AMJ is honored to present the following interviews with two distinguished leaders in their respective fields of respiratory medicine. Our first interview features Michael Boyle from the Cystic Fibrosis Foundation. Boyle's leadership and vision have been instrumental in transforming the landscape of cystic fibrosis research. Our second interview showcases the expertise of Julie Brahmer, Cancer Immunotherapy at Johns Hopkins University in Baltimore, a trailblazer in the field of cancer immunotherapy, with a particular focus on innovative treatments for lung cancer and other malignancies of the upper aerodigestive tract.

Featuring: Michael Boyle and Julie Brahmer

Michael Boyle

President and Chief Executive Officer, Cystic Fibrosis Foundation, Bethesda, Maryland, USA

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Q1 Readers of our *Respiratory* journal would recognize you as a vital figure in cystic fibrosis (CF) research and care. What led you to specialize in respiratory medicine, and specifically CF?

I originally went into adult respiratory medicine because of an interest in critical care, and I rarely encountered CF. All individuals with CF at Johns Hopkins Hospital, Baltimore, Maryland, USA, in the 1990s were taken care of by pediatricians. But one fortuitous morning, when I attended a pediatric CF clinic and met four young adults with CF, changed everything. All four were very ill, but I was taken by their bravery and absolute determination to live fulfilling lives, despite their disease and shortened life expectancy. I left clinic that day energized, and wanting to learn more. I was next taken by CF science; the *cystic fibrosis transmembrane conductance regulator* (*CFTR*) gene had recently been discovered, and the concept of using small molecules to restore *CFTR* protein function was just starting to emerge. When I subsequently obtained my first research grant from the CF Foundation, I fully committed to a career focusing on CF. The combination of a growing number of adults with CF and exciting new therapeutic science made the timing perfect.

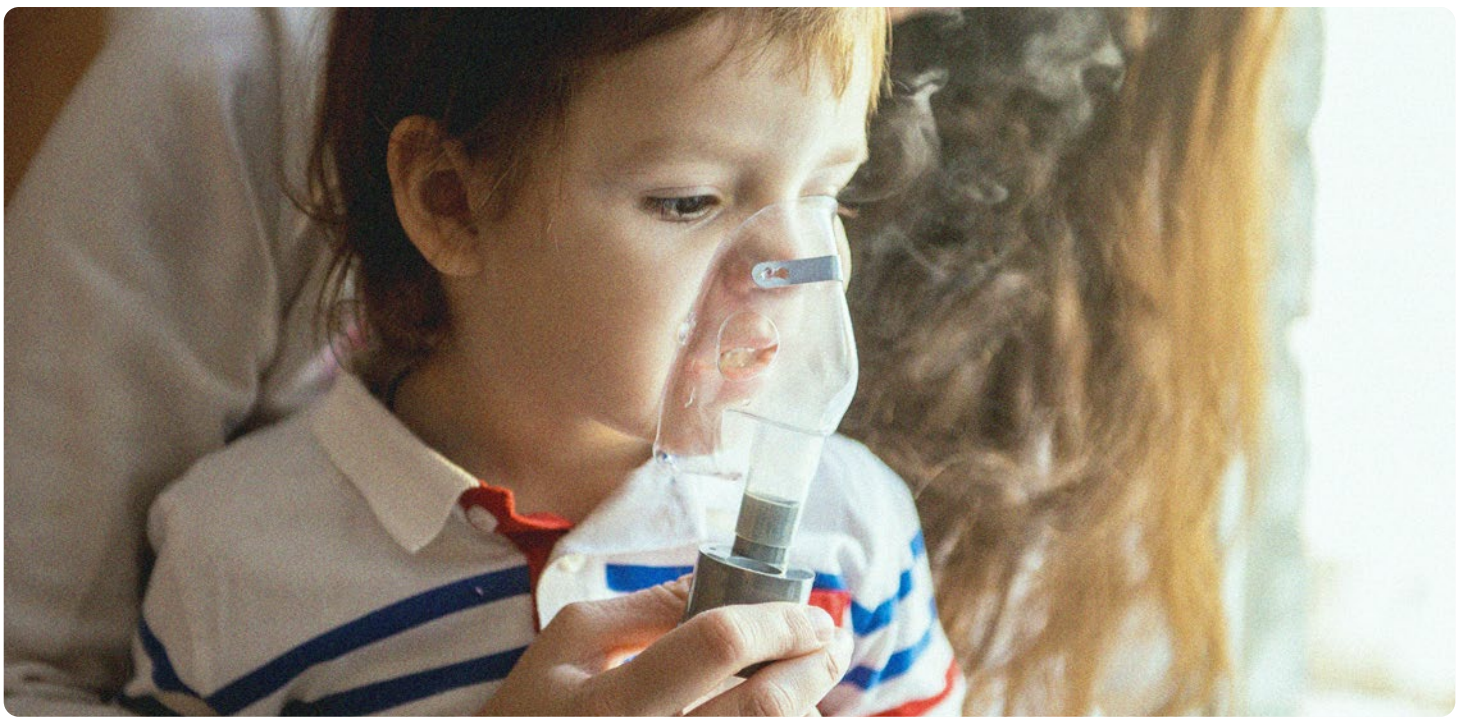
Q2 You founded the Johns Hopkins University Adult Cystic Fibrosis Program, which is now one of the largest in the country. Can you tell our readers about the initiation of this project, and the journey to where it is now?

As I mentioned earlier, all individuals with CF at Johns Hopkins in the 1990s were cared for by pediatricians, and the Pediatric Program was large and extremely well-run. However, a growing number of individuals with CF were living well into their 20s and 30s, and only having pediatric care didn't seem appropriate. After spending 2 years training with the Johns Hopkins Pediatric CF Team in the mid-1990s, I hired a nurse and an administrative assistant, put 40 medical charts of adults with CF in a wheelchair, rolled them over to the adult hospital, and officially opened the Johns Hopkins Adult Cystic Fibrosis Program. Within a few years, the program had grown to over 300 patients, and had developed a very active research program, driven by a wonderful team of caregivers and researchers. Today, the program has four full-time adult CF physician-researchers, and an entire multidisciplinary team devoted to adult CF care and research.

Q3 In 2015, you left your full-time faculty role at Johns Hopkins to join the CF Foundation. What led to you to make this change?

I loved my work and team at Johns Hopkins; I had been there for 29 years, and fully expected to spend my full career there. At the same time, I was always immensely impressed by the impact that the CF Foundation had on every aspect of CF: research, care, training, advocacy, and community support. So, when they asked me to come and oversee their clinical research work, I decided that it was a unique opportunity to make a difference for thousands of individuals with CF worldwide, not just my own patients. Taking over as President and Chief Executive Officer of the CF Foundation in 2020 provided an additional great opportunity to serve people with CF, and the CF community worldwide. While I still do see patients once a month at Johns Hopkins, my full focus is

> **"We're focused on accelerating the development of therapies that will benefit all people living with the disease"**



now on curing CF, and continuing the Foundation's long tradition of serving and supporting patients with CF, their families, and the science community.

Q4 How does the CF Foundation work to improve research and care in CF?

All our work is grounded in our mission: to cure CF and to provide all people who have the disease the opportunity to lead long, fulfilling lives, through funding research and drug development, partnering with the CF community, and advancing high-quality, specialized care.

> **People with CF and their families are at the center of our work**

Since 2020, the CF Foundation has invested more than 1.5 billion USD to address the needs of individuals with CF today, while developing the CF therapeutics of tomorrow. These therapeutics include the breakthrough *CFTR* modulators, which address the underlying cause of the disease, transforming the lives of people with CF by improving lung function and slowing disease progression. It is important to remember, however, that modulators are not a cure, and that 10–15% of people with CF cannot benefit from them, because either their CF mutations won't respond or because they cannot tolerate side effects.

This is why we're focused on accelerating the development of therapies that will benefit all people living with the disease, no matter what type of CF mutations they have. This work is the focus of our 'Path to a Cure' initiative, which has a 500 million USD initial commitment over 5 years, to attract the world's best genetic technologies to focus on CF. We announced this initiative upon my starting as Chief Executive Officer. This work is also supported by our therapeutics development ecosystem, which includes funding research; cultivating a robust drug development pipeline; conducting clinical trials in the CF Therapeutics Development Network, the largest CF clinical trial network in the world; sharing data from our patient registry; and providing companies access to the CF Foundation Therapeutic Lab's incubation space, in which they collaborate with our scientists and are able to tap into unique CF-specific resources. By funding early research, and providing meaningful support to researchers and companies at all stages of the drug development cycle, we're bringing more people into CF research, and accelerating the development of new therapies.

The CF Foundation provides significant support for multidisciplinary care teams at more than 130 accredited CF care centers across the USA. These care teams partner closely with patients to address complications associated with CF, including infection, CF-related diabetes, gastrointestinal issues, advanced CF lung disease, and mental health issues. As the experience of living with CF evolves for many, we are working to determine the best way to continue to tailor this care model.

Q5 What are you most proud of achieving, with regards to CF care and treatment during your time at the CF Foundation?

Perhaps the thing that I am most proud of since joining the Foundation in 2015 is seeing how much the lives of people with CF have changed for the better, because of therapies that we have helped to develop. What started as a pediatric disease with short survival has been turned into a disease with more adults than children, and those adults are feeling better; they're spending much less time in the hospital and taking medications, and are now more able to live fulfilling lives. But I am also proud that at the same time we celebrate this progress, we are more committed than ever before to developing therapies that will transform the lives of all people with CF, no matter what type of CF they have, and will lay the groundwork for a true cure for CF.

Q6 How do you incorporate community into your work at the CF Foundation?

People with CF and their families are at the center of our work, and are the driving force behind all our progress. With the CF population including more adults with CF than ever before, we have created a whole department at the Foundation dedicated to engaging with, listening to, and supporting individuals with CF. This department, appropriately called Community Partnerships, leads numerous programs that allow the CF community to directly inform our work, by partnering with us and advising on projects. Examples include patient-centered workgroups on research and care; our Adult Advisory Committee, which advises our Board; and Community Voice, a program for CF community members to inform, shape, and advance Foundation programs and research prioritization. Community Voice currently has nearly 2,000 members.

The CF Foundation also supports the community through Compass, a personalized, one-on-one patient navigation service that partners with people living with CF and their families to deal with challenges related to life with CF. In addition, Compass identifies access issues, and helps to shape our federal and state policy work.

In 2022, our Board of Trustees elected KC White, an adult living with CF, as Chair of the Board of Trustees. This marks the first time in the Foundation's history that an adult with CF has led the National Board of Trustees.

Q7 Which of the various research projects being conducted at the CF Foundation are you most passionate about, and how might this go on to change CF treatment?

CF is a complex disease, and while we have made incredible progress, developing a genetic therapy that can treat the underlying cause, no matter which *CFTR* mutations a person with CF has, will be our most challenging, and rewarding, work yet. For those who are not able to benefit from *CFTR* modulator medicines, there is an especially pressing urgency to move this work forward. That is why I am particularly passionate about the Path to a Cure work I mentioned earlier, a research initiative to deliver treatments for the underlying cause of the disease, and a cure for every person with CF by applying the world's most innovative science to CF. This is done through funding research programs at leading and emerging biotech companies.

One other thing that I am particularly excited about is that the genetic technologies we have been working on for the last several years are now emerging from preclinical development, and moving into clinical trials. There are five different CF genetic therapies moving into clinical trials in the next 18 months, including three inhaled *CFTR* ribonucleic acid trials, two gene therapy trials, and one antisense oligonucleotide trial. These therapies that we once thought of as 'someday' are now on our doorstep.

A final project I must mention is our recent investment in Prime Medicine, Cambridge, Massachusetts, USA, of up to 15 million USD to pursue gene editing for CF. This is one of the Foundation's largest investments in CF gene editing, and we are especially excited about the Prime Medicine science. If successful, it would lay the groundwork for a permanent repair of the *CFTR* gene.

Q8 Taking into account all research being done at the CF Foundation, and new therapies being developed, which developments do you hope to see in the near future for CF care and research?

As much progress as there has been with *CFTR* modulators to date, the years ahead will lead to even better, next-generation *CFTR* modulators. These modulators will be able to restore *CFTR* function in people with CF to near wild-type levels and, when started early in life, will prevent many of the complications we currently take for granted as part of CF. This will include not only the prevention of lung disease, but also pancreatic insufficiency.

The next few years will also provide a great deal of insight into the potential for genetic therapies to benefit all people with CF, no matter the mutations they have. I have no doubt that we will eventually get there, but the question is, how quickly? I am confident that the combination of the expertise of the CF science community, with the passion and commitment of the patients with CF and their family and community, will keep the rate of progress brisk, and will result in not only treatment for all people with CF, but eventually a true cure for CF.