Disclaimer: this information, which has been reviewed by a CF physician for accuracy, is a first-person account by Dr Eithne Cronin, GP and mother of a child with Cystic Fibrosis (CF). It was written in response to the election promise in 2022 re genetic carrier screening, to help educate clinicians about the advances in treatment for CF. In it she talks about her experiences as a parent of a kid with CF and what it looks like now, with the new CFTR modulators.

A piece about Cystic Fibrosis

She came early, 38 weeks all scrawny and limby and we were flooded with love.
Three weeks later she was even scrawnier, skin and bone really, and the call came. Your daughter has Cystic Fibrosis.
My non-medical husband imagined this as a mix of cerebral palsy and spina bifida so was just relieved to learn this daughter he adored would walk. My mind reeled, back to the paeds ward of the Dublin hospitals I trained in, where the clubbed fingers, pale, thin bodies, and lungs gasping for air clearly marked out the kids with CF. Those destined to die young after years fighting for breath.
That scrawny baby is 15 years old now. She's healthy and strong with a recent CT scan that shows normal lungs and essentially normal lung function. She has snorkelled and scuba dived, she's climbed a volcano and explored subterranean caves. I thought her childhood would be plagued by hospital stays and ill health, but she's spent only 4 nights in hospital in 15 years . CF has not stopped her do a thing. And that's before she has started on Trikafta, available on the PBS from April 1, 2022.
I do acknowledge that many others' CF journey has been much more difficult than ours.
I attended a CF conference not long after my daughter was born. It was scary and confronting but then the president of the Cystic Fibrosis Foundation from America spoke of the exciting drugs on the horizon that may alter the CF landscape .
Well, they are here now and we should know about them if we are to be counselling patients re genetic carrier testing.
As a med student gene therapy was going to be the saviour of diseases like CF but that failed to eventuate. But these bold and beautiful drugs actually correct the underlying defect in CF. They solve the issue that causes all the problems .

A simplified CF recap:

The CFTR gene and its protein product were discovered in 1989.
The protein is responsible for chloride transfer across the cell membrane. In CF this channel is faulty and without the chloride transfer to attract water to the cell surface, the mucus in various organs becomes thick and sticky leading to infections, lung damage, pancreatic insufficiency, and other issues
There are over 2000 mutations, but they are divided into 5 classes of mutations that mean this chloride fails to be transferred properly and CF sequelae ensue.
Class1- protein production- the protein is not fully produced due to nonsense mutations
Class 2 protein processing- the protein is produced but is missing an amino acid building block, so it doesn't get folded correctly and fails to stay in the correct 3D shape and is degraded and never makes it to the cell membrane
Class 3- protein gating- the protein is made, brought to the membrane but doesn't function well as the gate stays closed
Class 4 -protein conduction-the protein is made, sits in the membrane but doesn't conduct chloride as effectively as it should
class 5 - Insufficient protein- there is less of the CFTR protein in the cell membrane than is usual

Here's the exciting bit:

In 2000, The Cystic Fibrosis Foundation, an organisation founded by parents invested in a biotech company called Aurora biosciences,(later to be Vertex) as a form of venture philanthropy, the aim being to develop drug candidates to treat CF
in 2006 they started trials on ivacaftor- a CFTR modulator and it began to be used in USA in 2012. This switched on the protein to make it work . This showed huge promise for the class 3 mutations, where the protein is there, in the membrane, just not working and now ivacaftor , acts as a potentiator and makes it function better. This accounts for only 7% of CF cases.
In 2015 Ivacaftor was added to lumacaftor- now we have a corrector- it makes the protein be folded better so it can be brought to the cell membrane and then the potentiator activates it.-helpful for class 2 mutations
2019 FDA approves triple modulator- two correctors and a potentiator (elexacaftor, tezacaftor and ivacaftor) . The big guns. Trikafta is having fabulous results in worldwide trials and has just been approved for PBS listing in Australia. It will benefit 80% of CF cases
2022 and onwards- better modulators and amplifiers are in the pipeline including drugs to address the harder class 1 nonsense mutations.
The Cystic Fibrosis Foundations motto is “no one left behind” and “CF will stand for Cure Found”.
Having sold the royalties rights for CF treatments for $3.3 billion they have huge resources for investing in current and future research. They are a fascinating model of how a parent led organisation became venture philanthropists and changed the landscape of non-academic drug research to revolutionise CF care and outcomes.
Essentially, the CF landscape has dramatically changed.
It’s possible that with kids picked up at newborn screening , kept well until they start on CFTR modulators they may have normal life expectancy. We can’t be sure of this yet, but currently it looks like these drugs can make sweat tests return to normal, can reverse pancreatic insufficiency , can dramatically reduce lung infections and therefore progressive lung disease.
All of this means fewer hospital visits , fewer inpatient stays, and a much more normal life.
CF clinics are redesigning how they will provide care . It is likely when stable, as most CF patients will be, home monitoring and use of telehealth will reduce the burden of hospital attendances. Currently we do home spirometry with the lab technician on a video call. CF clinics are looking at the importance of preventing cardiovascular disease as they are anticipating their patients will live into their 6th decade and will be at risk of diseases of later life. like much of the adult population.
Of course, our family’s experience with CF is much rosier than many. We are fortuitous . I don’t take this for granted. We also live in a country that has funded good care and now these amazing CFTR modulators .
I know there has been much sorrow felt by many others due to poor CF outcomes.
But this is likely to be a lot less common.
I’m also aware the cost of these medications is huge and not every country will fund them, although costs will decrease over time.
I absolutely support offering genetic carrier testing to all prospective parents, but it requires skilled pre and post-test counselling to navigate the huge complexities of what to do with positive results.
I write this purely as an update on how the CF landscape looks so very different now than even 15 years ago when my daughter was born, and we owe it to our patients to ensure they are getting accurate information.
It’s not informed consent if the information is wrong.

If we are funding carrier screening, we must fund excellent training for GPs, fertility specialists, obstetricians and genetic counsellors and ensure this keeps up to date and stays abreast of developments.
In the meantime, I'll hug my cheeky, sassy, healthy 15-year-old and bask in gratitude for how things have changed.