

Impact story

Augmenting clinical decision-making

Working with the Cystic Fibrosis Trust, Turing researchers have been developing machine learning methods that could dramatically improve the accuracy of clinical assessments of people with cystic fibrosis.

- Cystic fibrosis (CF) affects more than 10,000 people in the UK, and leads to progressive respiratory failure.
- When to refer for a lung transplant – a major, risky operation – is traditionally based on a single measure called ‘forced expiratory volume’ (FEV), but fewer than half of the people referred in this way have a sufficiently urgent need for a transplant.
- Turing Fellow Mihaela van der Schaar applied cutting-edge machine learning to improve this referral process, utilising a data set representing 99% of all CF patients in the UK.
- A tool called AutoPrognosis (AP) was developed that considers years’ worth of patient-specific data on 115 variables, including genetics, BMI, infections, hospitalisations and more.
- AP predicts a disease trajectory for each patient, and makes correct referrals two-thirds of the time – a remarkable 35% improvement in accuracy over traditional methods.
- AP displays clear superiority to all competing methods for deciding when to refer patients for a transplant, in terms of both diagnostic accuracy and impact on clinical decision-making.

Impact

- Could help predict how a patient will fare without a transplant, and assist decision-making.
- Potential to dramatically improve the treatment process and quality of life for people with CF.
- Could also produce risk predictions for conditions such as heart disease and breast cancer.

“This work elegantly demonstrates that machine learning is now ready for the clinic.”

Professor Andres Floto, University of Cambridge and Cystic Fibrosis Physician, Royal Papworth Hospital



The predictive tool could assist clinicians in making more confident decisions, with their patient, about whether it is right to talk about a transplant.