

## Using machine learning to identify the right treatment for the right patient

Written by [David Glynn](#)

Research Team: David Glynn, John Giardina, [Julia Hatamyar](#), Ankur Pandya, [Marta Soares](#), Noemi Kreif



Giving the right treatment to the right person at the right time is a central goal of healthcare. There is a growing interest in moving away from a "one-size-fits-all" approach and instead tailoring treatment decisions to individual patients. However, decision makers often rely on evidence about the average effects of a treatment which makes it difficult to customise decisions. To do this effectively, it is important to understand how treatment outcomes and costs differ depending on various patient characteristics e.g., age, gender, blood pressure and kidney function.

Recently, machine learning (ML) methods have shown promise in helping identify these differences. Machine Learning techniques allow computers to find patterns in data which can be used to make predictions. Using this approach allows us to create

guidelines that match the most appropriate treatments to individual patient profiles. However, ML methods have not yet been fully integrated into models that consider long-term health outcomes and bring together data from multiple sources. Our research introduced a way to combine ML with decision models in healthcare. We also provided methods to use this analysis to identify subgroups of patients for whom health gains were maximised.

We demonstrated these methods using data from the SPRINT (Systolic Blood Pressure Intervention Trial) clinical trial , comparing the effects of using “standard” versus “intensive” blood pressure targets to treat people with high blood pressure. Our findings suggest that incorporating ML into decision models can change the estimates of the benefits of one-size-fits-all policies. We also found that expected health benefits can be increased by identifying groups of patients who benefit most from specific treatments.

In principle, more health gains could be made from limited healthcare resources if these methods are used to help decision makers choose the right treatment for the right patient.

Read the [full paper in Health Economics](#)

This work was funded by the UK Medical Research Council (MR/T04487X/1).

September 2024