

Big data analysis predicts risk of radiotherapy side effects

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Credit: Cancer Research UK

Analysing big data to predict men's risk of side effects could help personalise radiotherapy treatment for prostate cancer, according to new research presented at the National Cancer Research Institute's (NCRI) Cancer Conference in Liverpool.

Researchers at The Institute of Cancer Research, London , have, for the

first time, applied [big data](#) analytics to information from more than 700 men given radiotherapy to treat their prostate cancer. This included [medical history](#), genetics, [radiotherapy dose](#), and reported side effects.

Advances in technology allow huge amounts of different information to be combined and analysed at once. This technique is already used in many different settings, including to improve the accuracy of weather forecasts, make investments and trading decisions, and even monitor premature babies.

Researchers in this study used state-of-the-art artificial intelligence to highlight which information might predict sensitivity to the side effects of prostate radiotherapy. In particular, specific genetic characteristics – SNPs (single nucleotide polymorphisms) – were predictive of a patient suffering rectal bleeding.

At the moment there is no way to adjust doses of radiotherapy according to how sensitive a patient might be to the side effects. This means that while some men are receiving too much and suffering side effects, some are given too little and this compromises the chances of successful treatment.

Side effects include bowel, urinary and sexual dysfunction and can be difficult for patients to tolerate and can persist after treatment.

The researchers suggest that with further validation, this information could be used to create personalised treatment plans for [prostate cancer](#) patients. The technique could also be applied to many other types of cancer that are treated with radiotherapy.

Dr Navita Somaiah, co-lead researcher at The Institute of Cancer Research, London, said: "Advances in technology have enabled us to combine what we've learnt from decades of research into radiotherapy.

For the first time, we can now look at the full complexity of a patient's genetics, medical history and treatment, to predict if they are at risk of side effects.

"We hope that our method can be used to personalise radiotherapy for patients based on this risk, improving the chances of a cure and also minimising the side effects suffered.

"This has been a huge collaborative effort between clinicians, physicists, biologists, statisticians and data scientists."

Dr Di Gilson, member of the NCRI's Scientific Committee for the Conference, said: "Radiotherapy is a cornerstone of successful cancer treatment for thousands of patients. Unfortunately some patients who have [radiotherapy](#) will suffer long term side effects and for a minority these can be irreversible, progressive and debilitating.

"With more patients surviving their cancer than ever, it's absolutely essential to find treatments that are both effective and minimise side effects, so that more patients can also enjoy a better quality of life."

More information: Big-RT: Big Data analysis to identify combinatorial predictors of radiotherapy toxicity for personalised treatment in prostate cancer patients. [abstracts.ncri.org.uk/abstract ... ate-cancer-patients/](https://abstracts.ncri.org.uk/abstract...ate-cancer-patients/)

Provided by Cancer Research UK

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