

New service transforms childhood cancer treatment

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Professor Gareth Veal. Credit: Newcastle University

Children with cancer are to benefit nationally from a service which for the first time will allow doctors to personalise their treatment.

The therapeutic [drug monitoring](#) service, developed by Newcastle University experts, allows clinicians to obtain vital information about how much chemotherapy individual young [patients](#) should receive.

Youngsters diagnosed with cancer, including infants in the first weeks of life, can be particularly hard to treat as it is difficult to know how much chemotherapy to give.

Doctors sometimes have to make tough decisions about the most appropriate dose of a drug, without enough scientific information to help them decide on the best course of action.

Drug monitoring

The service was set up at the request of doctors at the Great North Children's Hospital, in Newcastle, UK, and other childhood cancer primary [treatment](#) centres around the UK.

It works by collecting [blood samples](#) after chemotherapy is administered on the first day of treatment. The samples are analysed in real-time to measure individual patient drug exposure, with the results generated used to adjust dosing accordingly.

The amount of chemotherapy given over subsequent days is then set to ensure that the patient receives a dose that is most likely to be effective but without causing too much toxicity, such as sickness and diarrhoea.

Professor Gareth Veal, from the Northern Institute for Cancer Research at Newcastle University, is leading the programme which is already benefitting many patients.

He said: "Establishing the correct dose of cancer treatment for very young patients has long presented a major clinical challenge as

developmental physiological changes can markedly impact on the effect of a drug once it has been administered.

"If the patient is under-dosed then the tumour may not respond to treatment, whereas if the patient is overdosed then they are likely to experience more unwanted side effects of the drugs.

"It is difficult to predict what happens to a drug following administration in terms of how efficiently it is broken down and removed from the body.

"Our therapeutic drug monitoring service involves measuring drug levels in individual childhood cancer patients during treatment and modifying the dose of drug that they are given to help provide the best clinical outcome."

Need for service

Before the service, clinicians would work out the infant or child's chemotherapy dose by the patient's weight and age, with a 'one size fits all' model

Dr. Gail Halliday, Consultant Paediatric Oncologist at Newcastle Hospitals NHS Foundation Trust, said: "The therapeutic drug monitoring service has transformed the way young cancer patients are treated and the positive outcomes they have.

"Before it was something of a guessing game as to the most appropriate dose of chemotherapy for each child, whereas now we can be rest assured that what we are giving is correct.

"In the past, the risk factors were you either under-dosed and if the tumour came back it would be more difficult to cure, or you overdosed

and the child suffered lasting effects from the toxicity.

"It is vital that we do everything we can to give each patient the best chance of responding effectively to treatment, whilst minimising the chances of experiencing unwanted drug side effects.

"Now there is real confidence that we're achieving a gold standard of care and it is thanks to the Newcastle University team that this is possible."

Further research

The service has been running at the Great North Children's Hospital for the past few years, but now the National Institute for Health Research has provided funding to Newcastle University to run a three year study to expand the service nationally.

Professor Veal said: "This will not only positively impact on patients recruited to the study, but will also generate data which will have a significant impact on future patient treatment through the provision of national guidelines for anti-cancer drugs in defined patient populations."

The therapeutic drug monitoring service is a finalist in the Bright Ideas in Health Awards, which celebrates the achievements of those within the NHS, industry and academia to improve patient care, with the awards evening being held later this week.

Patient's story

Little Blazej Sarnicki is lucky to be alive after the most challenging few years of his young life.

The five-year-old was diagnosed with aggressive Wilms' tumours in both kidneys in 2016 and is now on dialysis three times a week after both organs were removed to save his life.

The youngster has been in intensive care at the Great North Children's Hospital a number of times and it was touch and go as to whether he would survive. In the future he will need a kidney transplant.

Blazej was among the first to benefit from the therapeutic [drug](#) monitoring service as he required intensive chemotherapy and doctors needed to tailor his dose to his individual medical needs.

His mother, Monika, 38, a teacher, said: "It is fantastic to see how well Blazej is doing and it's thanks to the treatment he received that he's doing so well.

"We were devastated when Blazej was diagnosed with Wilms' tumours as we had never heard of the disease and there were times when we thought we'd lose him.

"I know that the [therapeutic drug](#) monitoring service helped to give him the best personalised treatment, and the medical team have worked incredibly hard to help Blazej.

"To have a service like this based in Newcastle is of great benefit to the North East and further afield."

Blazej is back at school and enjoying life with his twin brother, Oliwier, sister, Julia, nine, and parents Monika and Grezegorz.

Provided by Newcastle University

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