CCLG: The Children & Young People's Cancer Association research:

What factors affect the survival of children and young people with high-risk acute lymphoblastic leukaemia?

Project title: Long-term outcome and risk factors among children and adolescents with acute lymphoblastic leukaemia high-risk genetics.

Project stage: Complete (ended June 2025)

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Led by: Professor Anthony Moorman, Newcastle University

About the project

Acute lymphoblastic leukaemia is a treatable a type of blood cancer where many children and young people can be cured. However, successful treatment relies on being able to choose which treatment is best. For example, low-risk patients with should receive standard chemotherapy but high-risk patients, who are more likely to not respond to treatment or to have their cancer return after treatment, should receive more aggressive chemotherapy and sometimes need a bone marrow transplant.

To improve treatment, we to know more about which risk factors doctors can use to decide which patients should be in the high-risk group. Whilst there hasn't been research on this yet, the Leukaemia Research Cytogenetics Group (LRCG) has collected genetic information and clinical data about over 20,000 patients treated on UK clinical trials in the past 30 years. By combining this in-depth data with information from the trials about patient outcomes, the LRCG found several new genetic errors that makes ALL more high-risk.

In this project, Professor Anthony Moorman and his team at Newcastle University will be analysing the patients with these high-risk genetic errors in the LRCG's huge dataset. They hope to find out which other factors have an effect on high-risk patients' treatment outcomes. These factors could include age, sex, the number of white blood cells a patient has, their initial response to treatment, and what treatment they had.

This research project will generate high-quality information that can help doctors correctly assess which risk group a patient should be in, and therefore which treatment they need. Professor Anthony Moorman hopes that this information will be included in the next clinical trial for ALL, so it can help discover the best treatments for high-risk patients and influence the way children with high-risk ALL are treated in the future.

Results

The researchers worked on data from over 600 patients, each with one of seven recognised high-risk

genetic errors to assess survival for children with ALL. They found that the outcomes of patients with ALL and high-risk genetics has significantly improved over the past 30 years, which they found is due to the patients receiving more intensive chemotherapy or specific drugs.
The team also showed that 'high-risk genetics' is not just one group. Instead, the type of genetic error interacts with other risk factors like age or white blood cell count to affect survival. Prof Moorman believes that an integrated approach should be used in the future to determine the best treatment option.

What's next?

The findings will be published soon and will be used alongside other research to design more effective treatments for patients who are diagnosed with ALL and have high-risk genetics.

The team have also already been awarded a Cancer Research UK grant which will investigate how high-risk genetics should be interpreted in clinic to decide the best treatment options. The researchers hope to develop algorithms that can help stratify patients by risk, and to understand more about newly identified genetic errors.

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