Application number/Title: 35124- Leveraging UK Biobank data to inform on genetics of epilepsy, psychosis and complications in kidney transplant

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Keywords provided by the Applicant PI to describe the research project:

ancestry, creatinine, epilepsy, kidney, psychosis, skin

Application Lay Summary:

Many small genetic changes can contribute to a given human trait. We will create a score based on thousands of genetic variants that have been previously associated with skin cancer, kidney function and psychosis for each individual in the proposed datasets and tested as a predictor of these traits. The effect sizes will then be compared to our screened populations to see if they are significantly different.

We will compare these risk scores in the following screened populations:

- Skin cancer - we will compare the risk score calculated in the UK Biobank to people exposed to immunosuppressant drug treatment as part of a post-transplant treatment plan. This will allow us to see if the risk score is predictive of skin cancer in those who are exposed to these kinds of drugs (which are known to increase skin cancer risk) or predictive of skin cancer in the general population.
- Kidney function - we will compare the risk score calculated in the UK Biobank to people who have undergone a kidney transplant to see if the risk score is predictive of how well the transplanted kidney functions or if it can predict kidney function in non-transplanted individuals also.
- Psychosis - we will compare risk scores calculated in the UK Biobank to individuals who have been exposed to specific epilepsy medications and those who have epilepsy. This will allow us to find out if these risk scores can predict psychosis in general or if it can only predict psychosis in individuals with epilepsy.

This research aims to improve the safe and effective treatment of illness by creating risk scores that can identify patients at risk of treatment complications. We will also compare the genomes of individuals with Irish ancestry from specific regions in Ireland, and individuals from Britain and compare which regions in Britain share more ancestry with regions in Ireland). Investigating the

genetic similarities and shared structure between British and Irish populations will aid in the design of genetic studies in particular in rare genetic marker discovery.
Our research also aims to identify genetic markers that can be used to aid the diagnosis of disease (specifically in the development of epilepsy).
We expect the completion of these aims will take 24 months.