Project Title: Assessing the benefit and risk of kidney transplant to inform personalised clinical recommendation

Research Centre/Group and UoA: UoA10 Centre for Mathematical Sciences, Plymouth University

Staff involved: Project lead: Dr Yinghui Wei Second supervisor: Dr Malgorzata Wojtys

Studentship benefits: This project will strengthen our medical statistics research area, through producing high quality publications in both statistical and medical journals, enhancing collaborations with stakeholder, and contributing to an impact case study for the next REF. The student will have an excellent training experience through research, under the guidance of supervisors who have considerable expertise in medical statistics and computation. The student will have good career prospects of working as a medical statistician in academic setting, clinical institute or pharmaceutical industry. We will exploit our excellent links with clinicians in the Derriford hospital as well as key researchers locally and nationally.

External experts in the field

Prof L. Sharples (University of Leeds) Dr C. Jackson (University of Cambridge) Prof P. Royston (UCL)
Project Description:

Over the last ten years, the number of people dying from kidney diseases across the world rose markedly by 31.7%. In the UK, about three million lives are affected by kidney diseases. Every year about five thousands patients are on the active kidney transplant list in the UK. Nevertheless, there is a lack of appropriate analyses to answer pressing questions as to how donor types, patient characteristics and clinical setting may influence the outcome following transplant. This project aims to make effective use of clinical data, proposing advanced statistical analyses and producing reliable inference and developing intuitive outcome measures (Wei et al., 2015), to inform personalised recommendation for kidney transplant.

The objectives of this project are listed below:

1. Develop methods for analysing bivariate survival outcomes.
   Clinically, there is an association between the two primary outcomes, graft survival and patient survival. We will develop multivariate statistical models that are able to incorporate these two outcomes simultaneously, to make more precise estimation of the comparative effectiveness of using different types of donor.

2. Identify important factors influencing the survival following transplant.
   We will identify which type(s) of donor is most beneficial for what group(s) of patients. We will also develop algorithms for making prediction of the transplant outcome, by taking into account factors such as the disease severity, medical history, patient characteristics and clinical setting at the transplant centre.

3. Application and evaluation of the proposed methods.
   We will apply the proposed methods to existing data collected by our collaborators at transplant centres. We will evaluate the validity and the benefits of our proposed approaches over the conventional methods.

In addition to academic output in peer-reviewed journals, we will develop clinical impact from this project by the involvement of stakeholder and translating our research output into clinical decision tools which are useful for clinicians and patients.

References:
