# Correlation of laboratory biochemical measurements with survival using hospital metadata

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The clinical informatics unit at the Queen Elizabeth Hospital Birmingham (QEHB) has one of the largest patient information datasets in the world. This includes all records of hospital admissions in the UK over the last 15 years, associated blood laboratory test results from patients admitted at QEHB and comparator clinical datasets from patients admitted to hospitals in many other countries.

This project will focus on correlative analysis of the laboratory blood test measurements taken from patients admitted to QEHB with their ultimate clinical outcome. In particular we will focus on survival of patients at various timepoints after admission.

- All patients admitted to QEHB over the last 10 years will potentially be available for assessment
- Basic biochemical parameters such as haemoglobin, white cell count, creatinine and liver tests will be available from these patients (n >100,000).
- These will be converted into relative variation from median for the relevant age and gender
- The survival of patient subgroups will be examined using information from the Office for National Statistics (ONS) dataset which is currently available
- Mathematical analysis will be used to correlate individual measurements with clinical survival at 3 months, 1 year and 5 years after admission
- Methods such as Principle Component Analysis will be used to correlate measurements into appropriate groups

The aim is that this information will uncover novel features that may be able to predict the optimal laboratory parameters for survival in patients at the time of their admission.
The aim will be to publish this information in a leading journal and to develop novel mathematical tools that may be appropriate to interrogate this dataset.

**Required Skills** This project would suit students who have an interest in mathematical complexity within biological systems. In particular it will focus on health informatics which is a growing area of interest as demonstrated by >£50 million recent investment from UK research councils. The creation of the Farr Institute is one such recent investment (http://www.farrinstitute.org/).