

## CONFERENCE ABSTRACT

# Combining hospital and general practice data to predict the risk of hospitalisation in the Australian context

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**Introduction:** Predictive analytics have been used to identify people who are at high risk of a health event, and then offer a preventive intervention to avoid or delay that event. Health care systems in the UK, US, Europe facilitate the linkage of health data to allow predictive algorithms to be developed and applied. Data linkage in Australia can be challenging, with state funded public hospitals, private hospitals and federally funded independent general practices.

Problem statement – Is predictive modelling using hospital and general practice data feasible in the Australian setting? What is the utility of these predictive models?

**Methods:** Two general practices were approached to take part in this quality improvement project. Principal GPs were interested and willing to participate, and the practices used the same clinical practice software.

Central Coast hospital admission data for people from these practices were extracted from the hospital information systems and provided to the two practices. An extract of each practice's clinical system was taken for all active patients. These two datasets were combined at the general practice site, de-identified, and then provided to the researchers for analyses and predictive modelling.

This project was approved by the health service research office as a quality improvement activity

**Results:** Data extraction and linkage were achieved at both sites for over 3000 people.

Predictive models were developed for each site, with mostly the same variables, and minor differences in the estimates of effect. Models developed had a c-statistic of 0.74 to 0.77, and when applied to a practice population, were found to have a positive predictive value of about 25%.

**Discussion:** The usefulness of these models when applied to the practice population raises important questions. What is the intervention at the practice level? Do model results need to be incorporated into a staged selection process that leads to a more specific intervention? How will this operate in a treatment oriented fee for service primary health care system?

**Conclusions:** Predictive modelling using hospital and general practice data was feasible.

There are challenges in the transferability and sustainability of modelling, and how results are used to improve outcomes for people.

**Lessons learned:** It required a multiple stage process to address privacy and ethics concerns.

It is complex – there is variability in general practice clinical software, versions of software, versions of operating systems, individual use of clinical structures within software, and expertise of practice staff and IT support staff.

Predictive analytics are the first step. Perhaps more importantly, how will each person's risk estimate be used to improve their care, and prevent or minimise adverse health outcomes?

**Limitations:** This was a resource intensive process, requiring high level data management skills to address IT variability.

Practice and practitioner approach to the use of clinical software – how hospital, specialist and other services were recorded limited the scope for using this information.

**Suggestions for future research:** What are the likely quantifiable benefits of these approaches? (in Australia)

Are there other opportunities for this type of work in existing linkage projects?

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**Keywords:** prediction; analytics; patient selection; risk stratification; primary care

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