

## Supplementary Material for

### **Using machine learning to predict paediatric 30-day unplanned hospital readmissions: a case-control retrospective analysis of medical records, including written discharge documentation**

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**Table S1 presents the relative variable importance for the random forest algorithm**

Administrative Variables		Administrative & Clinical Variables		Administrative, Clinical & Written Discharge Documentation	
Variable	Importance	Variable	Importance	Variable	Importance
LOS at index admission	100.0	Usage of hospital services 12 months prior to the index admission - number of hospitalisation	100.0	Usage of hospital services 12 months prior to the index admission - number of hospitalisation	100.0
Number of co-diagnosis	88.6	number of co-diagnosis recorded in the patient progress notes	90.5	number of co-diagnosis recorded in the patient progress notes	90.5
Day of admission date (Monday to Sunday)	62.9	Usage of hospital services 12 months prior to the index admission - number of outpatient clinic attendance	72.7	Usage of hospital services 12 months prior to the index admission - number of outpatient clinic attendance	72.7
Day of Discharge Date (Monday to Sunday)	48.9	Usage of hospital services 12 months prior to the index admission - number of Emergency Department (ED) presentation	57.3	Completion of nursing admission and discharge planning form (Discharge Part)	58.8
SEIFA Percentile	29.6	LOS at index admission	38.6	Delay in issuing discharge summary (date of discharge summary been issued - date of discharge)	57.9
Age	24.4	Number of co-diagnosis	34.2	Usage of hospital services 12 months prior to the index admission - number of Emergency Department (ED) presentation	57.3
Day of Discharge (Weekday/Weekend & Public holiday)	23.4	Significant social history (legal custody issue or patient under the care of Department for Child Protection)	27.1	Completion of nursing admission and discharge planning form (Admission Part)	44.1
Admission status	14.6	Day of admission date (Monday to Sunday)	24.3	LOS at index admission	38.6
Had intensive (ICU) stay	14.6	Significant vital signs	21.4	Number of co-diagnosis	34.2
Health insurance status	14.6	Day of Discharge Date (Monday to Sunday)	18.9	Significant social history (legal custody issue or patient under the care of Department for Child Protection)	27.1
Distance from residential address to hospital	14.0	Significant imaging result	14.0	Day of admission date (Monday to Sunday)	24.3
Day of Admission (Weekday/Weekend & Public holiday)	11.7	SEIFA Percentile	11.4	Significant vital signs	21.4
Funding source as an inpatient	10.1	Age	9.4	Last entry progress note made by allied healthcare providers	20.3
Care type	5.9	Day of Discharge (Weekday/Weekend & Public holiday)	9.0	written evidence of discharge information given by nurses	19.0
Source of referral transport	4.0	Significant laboratory result	8.3	Day of Discharge Date (Monday to Sunday)	18.9
Had general anaesthetic	2.9	Added new medication at discharge upon existing regular medication regime	7.9	written evidence of discharge medications information by physician	17.2

Gender	0.0	Known allergies	6.8	Clinical pathway or the last entry progress note made by nurses	17.0
		Admission status	5.7	Written evidence of follow up information given by physician	14.1
		Had intensive (ICU) stay	5.7	Significant imaging result	14.0
		Health insurance status	5.7	Consistency of written discharge documentation among healthcare providers	13.6
		Distance from residential address to hospital	5.4	SEIFA Percentile	11.4
		Language spoken other than English	4.6	Written evidence of follow up information given by nurses	11.0
		Day of Admission (Weekday/Weekend & Public holiday)	4.5	Age	9.4
		Funding source as an inpatient	3.9	Day of Discharge (Weekday/Weekend & Public holiday)	9.0
		Care type	2.3	Significant laboratory result	8.3
		Source of referral transport	1.5	Added new medication at discharge upon existing regular medication regime	7.9
		Had general anaesthetic	1.1	Known allergies	6.8
		Gender	0.0	Admission status	5.7
				Had intensive (ICU) stay	5.7
				Health insurance status	5.7
				Distance from residential address to hospital	5.4
				written evidence of discharge medications information by nurses	5.2
				Language spoken other than English	4.6
				Day of Admission (Weekday/Weekend & Public holiday)	4.5
				Funding source as an inpatient	3.9
				Written evidence of discharge information given by physician	2.3
				Care type	2.3
				Operation sheet or the last entry progress note made by physician	2.3
				Source of referral transport	1.5
				Had general anaesthetic	1.1
				Gender	0.0