

## Supplement 3

Goodness of fit metrics for the modified Poisson regression model:

Model	Residual deviance	p-value	Pseudo R-squared	BrierScore
Admissions	25677	1	19.5%	0.085
ICU	8119	1	30.9%	0.020
Ventilation	5145.5	1	31.6%	0.012
Death	5738.5	1	33.3%	0.014

The Pseudo R-squared is calculated as the improvement from the null model to the fitted model.

Goodness of fit metrics for the Bayesian Network model:

	Admission		ICU		Ventilation		Death	
	Accuracy	Balanced Accuracy	Accuracy	Balanced Accuracy	Accuracy	Balanced Accuracy	Accuracy	Balanced Accuracy
Model	0.866	0.663	0.969	0.679	0.981	0.649	0.979	0.638
Baseline	0.802	0.501	0.952	0.499	0.973	0.498	0.971	0.500
Lift	8.0%	32.3%	1.8%	36.1%	0.8%	30.3%	0.8%	27.6%

The baseline accuracy measures give the level of accuracy that would be obtained if positive COVID-19 outcomes were determined through random sampling or guessing. The Bayesian Network models provide for a 32%, 36%, 30%, 28% lift in predictions for Admissions, ICU, Ventilation and Death respectively relative to the baseline.