

Modelling and Prediction

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'Prediction is very hard, especially about the future'

- Our goal is to predict the levels of certain adverse events, by using HIPE data
- Our chart review is taken as the source of truth
- Our models are built on the HIPE data corresponding to the chart review discharges



Materials

- Expert chart review of medical and nursing records, for one hospital
- Adults 65 and over selected to be 50% medical and 50% surgical patients
- Corresponding HIPE records
- National HIPE records



Methods

- Random forest models
- Bayesian logistic models
- These are quite different approaches to modelling, so if they give similar results, that is at least comforting

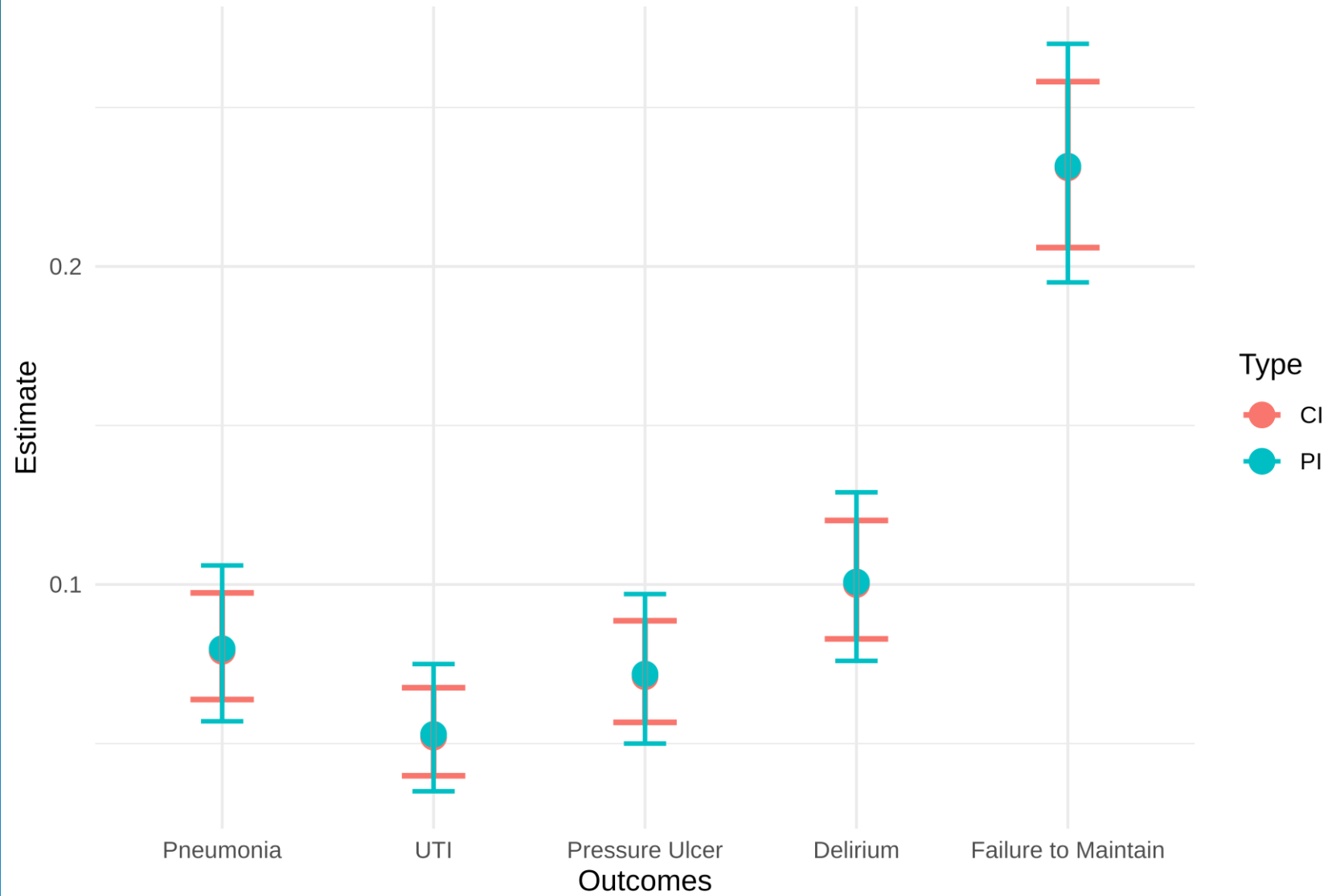


Code

- From <https://github.com/stainesa/Cost2Care>
- Uses R



95% Prediction and confidence intervals for each outcome



Results - 2

Adverse event	Variable set used	Chart review (observed)	Chart review (RF prediction)	Chart review (GLM prediction)	National rate (RF prediction)	National rate (GLM prediction)
F2M	Full	23%	22%	23%	21%	19%
	Restricted		21%	25%	19%	19%
Delirium	Full	10%	9.6%	10%	7.2%	5.3%
	Restricted		8.9%	9.4%	7.0%	5.5%
Pneumonia	Full	7.9%	8.4%	8.0%	6.1%	5.1%
	Restricted		8.8%	9.6%	5.9%	6.0%
Pressure Ulcer	Full	7.0%	9.3%	7.4%	7.1%	6.4%
	Restricted		8.1%	9.0%	7.4%	7.4%
UTI*	Full	5.2%	5.8%	4.5%	4.9%	6.1%
	Restricted		5.2%	4.2%	4.9%	4.1%

*UTI – Urinary tract infection

Conclusions

- These are serviceable predictions, at least at hospital level
- The similarity between the results for the two models is reassuring
- Our approach is viable



Thank you

- Any questions?

