

International Journal of Population Data Science

Journal Website: www.ijpds.org



Building a model by the NHS, for the NHS: Forecasting future hospital activity and the left shift of care

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Objectives

Estimating future activity levels represents a critical step in the process of scaling and designing new hospital infrastructure. The Strategy Unit has developed a hospital demand and capacity model by the NHS, for the NHS to support key stakeholders to make robust and auditable projections of activity.

of developing a complex probabilistic model for use by non-technical audiences.

Methods

The New Hospital Programme (NHP) demand and capacity (D&C) model is a Monte Carlo simulation model, which uses pseudonymised row-level activity for a specific hospital or catchment population in an agreed baseline period. It performs a set of transformations on the baseline to reflect anticipated changes in activity and resource levels that might occur in some future year. The model has been in use for just over a year, supporting NHP schemes with their redevelopment plans. Our data sources include NHS Hospital Episode Statistics (HES) and the Office for National Statistics.

Results

The NHP model is unique in its complexity, detail and ambition; there are over 120 parameters that can be set by end users. These ensure that projected activity considers a wide range of factors including demand-supply imbalances, population growth, non-demographic growth, and various strategies to reduce hospital activity. In addition, the model is probabilistic and allows users to express the parameters that are set in terms of prediction intervals, and view results as a range of possible futures with an average of forecasts.

The model has also been expanded to forecast activity on a regional and national level; this has helped to inform work looking into the so-called “left shift” of care from hospitals into the community.

Conclusion

The NHP D&C model is the first of its kind within the public sector. I will address some of the key challenges encountered during its development, and share learning from the process

