

Plain English Publication Summary

Publication title: [Dynamic models to predict health outcomes: Current status and methodological challenges](#)

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Jenkins DA, Sperrin M, Glen P Martin GP, Peek N. Dynamic models to predict health outcomes: Current status and methodological challenges. Diagnostic and Prognostic Research. 2018.

What was known before your paper was published?

Clinical prediction models (CPMs) are used for diagnosis or prediction of future outcomes, which can be used throughout the healthcare system to aid in decision making. These are typically produced by analysing historical, routine care data to generate a model, in order to compute the risk of an outcome for a given set of patient characteristics. Over time, population demographics, prevalence of disease, and healthcare policies may change, meaning that predictions based on past data can become outdated and less accurate. Dynamic prediction models learn from themselves and new patient data through time and have therefore been discussed as a potential solution to retain accuracy.

What did you do?

We conducted a literature review of published papers to obtain an understanding of dynamic prediction modelling methods. All the methods found in the search were then explained in detail and any challenges were highlighted. We then discussed future work needed to advance the field of dynamic prediction modelling.

What did you find?

We found 11 papers which discussed 7 dynamic prediction modelling methods.

Dynamic models are rare and there are still many unanswered questions and challenges which need to be addressed for these models to be accepted and used in practice. The key challenges are the testing of dynamic prediction models and the limited software packages and tutorials available to implement them.

What insights/knowledge did you add?

Our review combines together the dynamic modelling methods into one paper and provides insights into the methods, challenges and future work needed. We identified an additional method, varying coefficient modelling, that could be used in healthcare but has yet to be implemented for dynamic prediction in a healthcare setting. This method uses data currently available and attempts to model the dynamic patterns in the data. This provides estimates as a function of time which can help retain accuracy of the model in the future. Currently, this way the only method which did not update as new information is collected and we suggest this could be done to further improve the model.