

Abstract

Statistical models are needed to produce estimates and forecasts of health coverage indicators in low- and middle-income countries, where data are often sparse and of uneven quality. We consider a class of Bayesian transition models for this purpose and propose a practical set of model checks that can be used by analysts who are not specialists in Bayesian (transition) models. These checks include residual analyses and assessments of model parameters in restricted and full models, based on in-sample and out-of-sample model fits. We apply the approach for estimation of two different health coverage indicators: the proportion of women who received recommended antenatal care during pregnancy and the proportion of children who receive recommended vaccinations. The checks indicate the model performs well for antenatal care, and they highlight limitations and opportunities for improvement when modelling immunization coverage. Overall, we show how systematic model checking can clarify and communicate the strengths and limitations of models used to estimate and forecast global health coverage indicators: the proportion of women who received recommended antenatal care during pregnancy and the proportion of children who receive recommended vaccinations. The checks indicate the model performs well for antenatal care, and they highlight limitations and opportunities for improvement when modelling immunization coverage. Overall, we show how systematic model checking can clarify and communicate the strengths and limitations of models used to estimate and forecast global health coverage indicators.