to improve delivery of care. However, prediction models used in medical research often fail to accurately predict health outcomes due to methodological limitations. These models particularly perform poorly when predicting narrowly targeted subgroups of patients. We explore the role of latent class regression (LCR) analysis to model the survival of patients with CHF. We seek to show that using LCR improves the modelling of health outcomes as it accounts for unobserved heterogeneity that exists naturally within the patient data.

**Methods** LCR generally involves identifying hidden latent classes within data and uses patient’s demographic characteristics and other covariates to predict class membership and separate regression models for each class. These latent classes may correspond to subgroups of patients with specific characteristics that affect their survival. The rationale is that one class will be more susceptible to deaths compared to another. The United Kingdom Heart Failure Evaluation and Assessment of Risk Trial (UK-HEART) recruited patients with signs and symptoms of CHF between July 2006 and December 2014. A total of 1802 records were available on patient characteristics as well as medications. We used some of these variables to model survival of patients within a latent class framework by estimating a single regression model for both latent classes. We increased complexity of our model by allowing each class to have a separate survival model.

**Results** We used the area under the receiver operating characteristic (ROC) curve to assess the performance of these two class models. Overall, our novel approach performed better than the traditional one-model-fits-all approach. Our model gave an area under the curve (AUC) of 0.87 while the traditional model yielded an AUC of 0.68.

**Conclusion** Ignoring the natural heterogeneity that exists within the patient data affects the accuracy of estimates in prediction models. Researchers can utilise the available data to identify hidden latent classes within the data. Fitting a regression model to each latent class improves the accuracy of the prediction estimates.