OBJECTIVE: To estimate the cost-effectiveness of diagnostic pathways for assessing patients with ischemic cardiomyopathy to identify patients with viable myocardium with a view to revascularisation.

BACKGROUND: The aim of the diagnostic pathways is to assess patients with ischemic cardiomyopathy in order to identify those with viable myocardium with a view to revascularisation. The clinical challenge is to identify patients with viable myocardium that have the potential to recover if revascularised and ensure those patients are appropriately treated with surgical or catheter based coronary intervention, and that those with non-viable myocardium in the target area for revascularisation are not intervened upon unnecessarily.

The main benefits of diagnostic testing relate to identification and treatment of patients with potential for revascularisation using either PCI or CABG. The disadvantages are the risks associated with adverse events of unnecessary revascularisation. The direct costs of diagnostic management include the costs of diagnostic testing include the costs of investigation and the subsequent costs of providing treatment (revascularisation or medical therapy). The suboptimal nature of the diagnostic tests (i.e. sensitivities and specificities below 100%) mean that some patients with viable myocardium will not receive revascularisation and similarly, some patients without viable myocardium will receive revascularisation, probably unnecessarily, based on the potential lack of benefit from revascularisation, its costs and its risk of mortality. A de novo economic model was built to analyse the effects of different diagnostic management pathways on these costs and benefits.

METHODS: A de novo economic model was developed using Microsoft Excel software to explore the costs and health outcomes associated with different diagnostic pathways. The economic perspective of the model is the NHS in England and Wales with the structure of the model described below.

The different diagnostic pathways were applied to a hypothetical cohort of patients with ischemic cardiomyopathy. It was assumed that the diagnostic pathway would identify patients with viable myocardium and that the probability of successful identification of viable myocardium and non-viable myocardium was controlled by the overall accuracy of the diagnostic pathway. It was assumed that patients diagnosed with viable myocardium would be managed promptly by revascularisation and that the patients diagnosed with non-viable myocardium would be on medical therapy. The model assigned each patient a risk of death and rehospitalisation depending upon whether they are truly viable and whether they had revascularisation or not. Each patient then accrued lifetime DALYs. Health care costs were also accrued through measuring diagnostic costs and treatment costs, depending on the pathway and their treatment status.

RESULTS: The results of economic model using evidence from the Allman et al (2002). Stress CMR is cost-effective with a mean ICER of £10728/GALY compared to no testing strategy and CE CMR has an ICER of £29065/GALY compared with Stress CMR. Both strategies are cost-effective assuming a threshold of £20,000/GALY. Echo and SPECT are dominated by Stress CMR and CE CMR respectively. Also, PET is not cost-effective at a threshold of £20,000 per QALY as it has an ICER of £21,298/GALY compared with CE CMR. Furthermore, the strategy of revascularising everyone is dominated by PET. Thus, CE CMR is estimated to be the most cost-effective option at a threshold of £20,000/GALY.

CONCLUSIONS: Diagnostic parameters and mortality rates of the different subgroups are the key drivers in the model. Two different scenarios relating the mortality rates were analysed in the model, this approach was taken to address the uncertainty in the mortality evidence. For decision makers deciding which of these presented results are most representative of their setting, the key questions relate to the effect of revascularising non-viable patients. There are a number of issues with abstracting the data for cost-effectiveness modelling of diagnostic tests. For example, the diagnostic accuracy depends upon the type of index test, gold standard test and threshold used. Furthermore, the benefits of treatments after diagnosis are not always clear and might be linked to the type of diagnostic test. Appropriate caution needs to be taken when evaluating diagnostic tests.

REFERENCES: