This study was funded by Novartis Pharmaceuticals Ltd, Finney Business Park Finney, Camberley, Surrey GU16 7SR | Poster presented at ISPOR 18th European Congress | 7–11 November 2015, Milan, Italy

CONCLUSIONS
- Economic modelling using a discrete event simulation (DES) model confirmed that fingolimod is cost-effective in the treatment of highly active (HA) relapsing-remitting multiple sclerosis (RRMS), in line with previous modelling performed using a Markov model.
- The probability of fingolimod being cost-effective vs dimethyl fumarate at a willingness-to-pay threshold of £30,000 per QALY was similar for both models (>70%).
- This study helps to internally validate the DES as a suitable model type in RRMS and, given the greater flexibility inherent in programming the structure of DES-type models, it may be found to be more easily adaptable compared to the Markov model for dealing with changing assumptions on chronic adverse events, treatment sequences, and long-term efficacy.

INTRODUCTION
- Multiple Sclerosis (MS) is a chronic immune-mediated disease characterised by the involvement of the central nervous system, causing symptoms such as movement problems and sensory disturbances that usually follow a relapsing-remitting pattern (RRMS), before progressing to the secondary-progressive stage (SPMS).1
- Fingolimod is an immunomodulatory, disease-modifying therapy (DMT) that is licensed in the EU for patients with RRMS that is highly active (HA) despite treatment with at least one other DMT; it is also licensed in the EU for rapidly evolving severe (RES) RRMS.2,3 NICE has recommended fingolimod for HA RRMS, but currently recommends dimethyl fumarate for RES RRMS that is not HA or RES.
- Economic analysis using a Markov model has previously found that fingolimod is cost-effective vs dimethyl fumarate in the treatment of HA RRMS.4
- Discrete event simulation (DES) provides an alternative modelling structure that tracks simulated patients individually in continuous time. The results obtained from this alternative structure may reinforce the results from previous analysis performed using a Markov model.5
- Both the Markov and DES models were most sensitive to treatment effect on disability progression, but robust to other changes including a wide range of PAS estimates.6

METHODS
- Cost-effectiveness analysis of fingolimod compared to dimethyl fumarate for the treatment of HA RRMS was performed based on a previously published Markov model and a new DES model that was developed using Microsoft Excel and C++ software (Figure 2).1
- Previously published post hoc clinical data from the HA subgroups of the REMS clinical trials for fingolimod or dimethyl fumarate vs placebo were input into the Markov and DES models (Figure 3).4,6

OBJECTIVES
- This work sought to compare the Markov and DES economic models used for the cost-effectiveness analysis of fingolimod and dimethyl fumarate for the treatment of HA RRMS in the UK.

RESULTS
- In the base case, the average probabilistic incremental cost-effectiveness ratio (ICER) for fingolimod vs dimethyl fumarate using list prices was found to be £13,211 per QALY using the DES model (incremental cost: £9,092; QALYs: 0.74) and £14,076 per QALY using the Markov model (incremental cost: £10,356; QALYs: 0.76) (Figure 4).
- The probability of fingolimod being cost-effective at a willingness-to-pay threshold of £30,000/QALY was 76% in the DES model and 73% in the Markov model; the DES model consistently estimated a slightly higher probability of fingolimod being cost-effective across all willingness-to-pay thresholds tested (Figure 5).
- Both the Markov and DES models suggested that in the base case fingolimod remained cost-effective at willingness-to-pay thresholds of £20,000 and £30,000 per QALY, unless the difference between the level of dimethyl fumarate PAS discount and fingolimod PAS discount was considered (Table 1).
- Both the DES and Markov models were most sensitive to treatment effect on disability progression, but robust to other changes including a wide range of PAS estimates.7

References
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