

Web extra 1: Description of the Sheffield type 2 diabetes model

The Sheffield diabetes model is an integrated health state simulation model of the natural history of diabetes and the lifetime cost effectiveness of different treatments for type 2 diabetes. It was constructed using Excel for Windows 2003 spreadsheet package, with programming in visual basic for applications. The model is at the patient level and replicates patients' risk of progression through five co-morbidities: retinopathy, nephropathy, neuropathy, coronary heart disease, and cerebrovascular disease. The intensity of management and monitoring can be varied by altering targets such as those for glycaemic control, requirement for insulin, blood pressure control, and intensity of lipid-lowering therapy. For microvascular complications, the model is largely based on the Eastman models,^{1 2} using results from the Diabetes Control and Complications Trial (DCCT). For macrovascular complications, the model uses equations from the United Kingdom Prospective Diabetes Study (UKPDS).^{3 4 5}

The time spent by patients in each state for each comorbidity is recorded—for example, years spent on dialysis, severe vision loss—together with transitions between states. The effects of treatments on complications are modelled either via a relative risk (for example, for the effect of photocoagulation on risk of severe vision loss) or via the effect on underlying risk factors (for example, the effect of antiglycaemic medication on HbA_{1c}). Complications are driven by individual demographic and modifiable characteristics at each time period, and the model includes diabetes and other- cause mortality.

Total costs are obtained by adding the costs of therapy, the costs of one off treatments (for example, cost of amputation), and the cost of ongoing treatment of complications (for example, treatment following stroke). The health benefit, the incremental quality adjusted life years, is obtained by applying quality of life measures to the time spent in the various diabetic health states. Cost effectiveness estimates for potential interventions are obtained by dividing the total costs by the incremental quality adjusted life years.

The model structure is shown in web figure A. More details of the model are available in an economic evaluation of screening for type 2 diabetes.⁶

References

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