

Seminar Talk

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The Evaluation of Screening Policies for Diabetic Retinopathy using Simulation

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Abstract

The aim of this study was to use computer simulation to compare and evaluate different screening policies for retinopathy in patients with Type 1 (juvenile onset) and Type 2 (mature onset) diabetes. Retinopathy is a serious but common complication of both types of diabetes, and is the leading cause of blindness in developed countries. However, it can be successfully treated if detected sufficiently early. A number of different screening schemes are currently in operation, involving different settings, screeners, techniques and screening intervals, and there is no consensus about the ideal form a screening programme should take.

The model simulates the progression of disease in a population of patients, for example representing a city or region, including new cases as they are diagnosed. The output from the model includes the years of sight saved and other functional measures such as retinopathy status, as well as information about the health care resources required. The simulation was run for different screening policies using a population base of 500,000. Most parameters were derived from peer-reviewed publications. Standard methods of screening perform similarly, saving up to 50% of the potential sight years lost. They give up to 85% of the sight years saved by an idealised “gold standard” programme. The most cost-effective method was a mobile camera, with initial annual screening and six-month follow-up after the detection of background retinopathy, which had an estimated cost of £2,842 per sight year saved. It is less efficient to screen Type 2, rather than Type 1 diabetes mellitus patients, but they contributed to almost three quarters of the sight years saved. Programmes with frequent screening are more robust to fluctuations in compliance and screening sensitivity.

References:

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