PenCHORD

NHS
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Health Research

The Peninsula Collaboration for Health Operational Research & Development

Can the retinal screening interval be safely increased to two years for Type 2 diabetic patients without retinopathy?

Summary:

We developed a simulation model to predict the impact on patient vision of screening patients with Type 2 diabetes for diabetic retinopathy every two years, rather than annually, for those who had not yet developed retinopathy. We used agent-based modelling to simulate the retinopathy progression of individual patients, their attendance at screening appointments and their treatment. We populated the model with data obtained from the Royal Devon and Exeter NHS Foundation Trust. Our model predicted that by screening patients who have not yet developed retinopathy every two years until they are identified with retinopathy, there would be no impact on the proportion of patients who would lose their vision and there could be a 25% saving on screening costs.

Context:

The prevalence of diabetes continues to grow globally. In the UK, screening services are facing increasing strain because of significantly increasing demand, coupled with static investment in resources. Current NICE Guidelines specify that diabetic patients should be screened for retinopathy at least annually. However, for many, diabetic retinopathy is a slow-progressing disease, so there are concerns that the current screening policy is excessive, particularly in light of the growing strain on resources.

The project sought to determine, via simulation modelling, whether patients with type 2 diabetes who hadn't yet developed retinopathy (R0 patients) could be screened every two years, rather than annually. PenCHORD collaborated with a Diabetic Retinal Screening Manager, a Consultant Endocrinologist and an Operational Performance Manager at Royal Devon and Exeter Hospital. The study took place in 2011, over the course of 6 months.

Method:

We developed an agent-based model that simulated the retinopathy progression of type 2 diabetes patients, as well as their concurrent screening and treatment attendances. The model was built using AnyLogic framework software. The model was parameterised using values obtained from analysis of anonymised data of 3,537 patients and 33,810 screening appointments from 1991 to 2011, supplied to us by the Royal Devon and Exeter NHS Foundation Trust. We generated 15 year forecasts from the model.
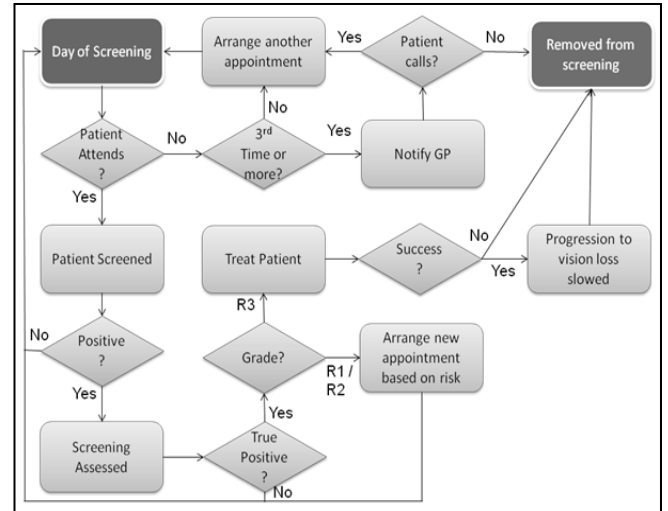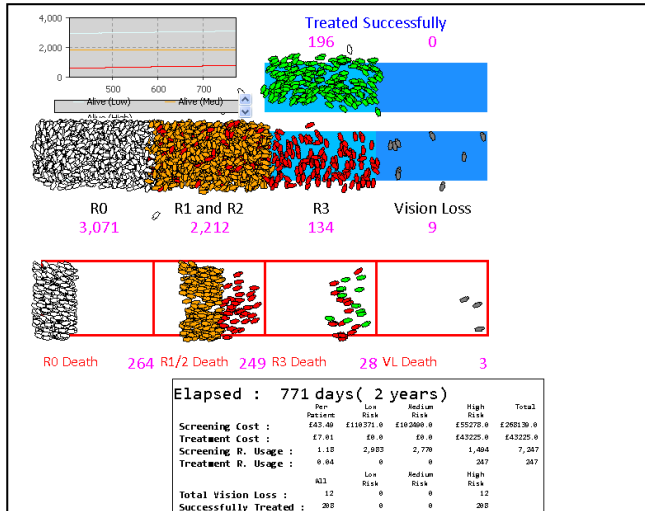
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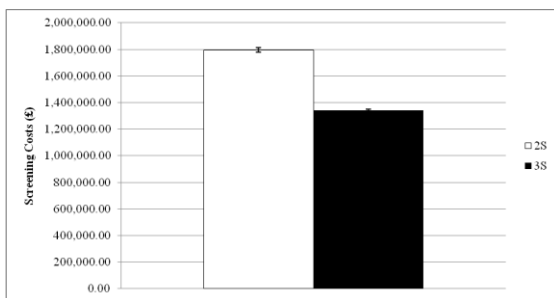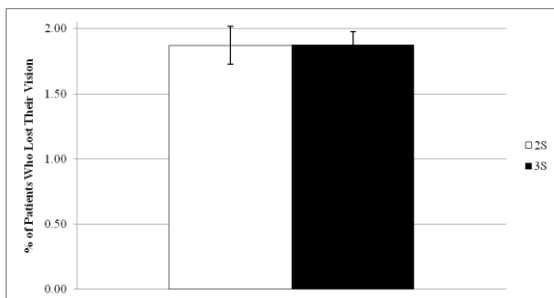
2S = 2 Stream Policy (Current policy – Screen R0 and R1 patients annually, and R2 patients every 6 months)

3S = 3 Stream Policy (Proposed policy – Screen R0 patients every two years, R1 patients annually, and R2 patients every 6 months)

Our model predicts that, by screening patients without retinopathy every two years until retinopathy is detected, the number of patients who lose their vision is unaffected, implying that patients are still identified for treatment sufficiently early. Furthermore, the model estimates that screening costs could be reduced by 25%.

Evaluation and Impact:

The results of the study have been published in the high-impact journal Diabetes Care, and both Royal Devon and Exeter NHS Foundation Trust and Cornwall and Isles of Scilly NHS have expressed an interest in piloting a two-year screening programme on the back of this evidence. The study is also being considered as part of a national review of evidence for changing the diabetic retinopathy screening interval.

Contact and more information:

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