A personalized screening strategy for diabetic retinopathy: A cost-effectiveness perspective

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Background

- Diabetic retinopathy (DR) is one of the leading causes of visual impairment and blindness
- Screening diabetic patients is an effective way to decrease the burden of DR
- Many countries use annual or biannual screening programs
- However, just a minority of type 2 diabetic patients eventually develop sight-threatening diabetic retinopathy (STR)

Aims

- Finding the optimal personalized DR screening strategy based on a previously developed model[1] for patients type 2 diabetes
- Compare this strategy to annual screening and the Dutch guideline

Methods

- Using observational data (1998-2017) from the Diabetes Care System, a cohort of people (N = 5,514) with type 2 diabetes in West Friesland region
- Slow and fast STR progression assumptions were taken for missing values of STR grades
- The outcome of each strategy, i.e. “missed cases”, were determined by comparing model based screening intervals to observed time to develop STR
- Costs were calculated based on screening and travel costs
- First the optimal screening strategy was determined based on different risk margins, then outcomes and costs were compared for the different screening strategies

Results

- Comparing the personalized screening strategy with the annual strategy resulted in **11.0 to 11.6% more** missed STR cases with **€8.3 to €10.4 less** cost per patient for the slow (risk margin: 2.7%) and fast (risk margin: 2.0%) STR progression assumptions
- The personalized screening strategy resulted in **7.1 to 9.0% less** missed STR cases compared to the Dutch guideline screening strategy
- With the slow STR progression assumption the personalized screening strategy is **€0.2 per patient cheaper**. With the fast STR progression, it is **€1.9 per patient more expensive** than the Dutch guideline strategy

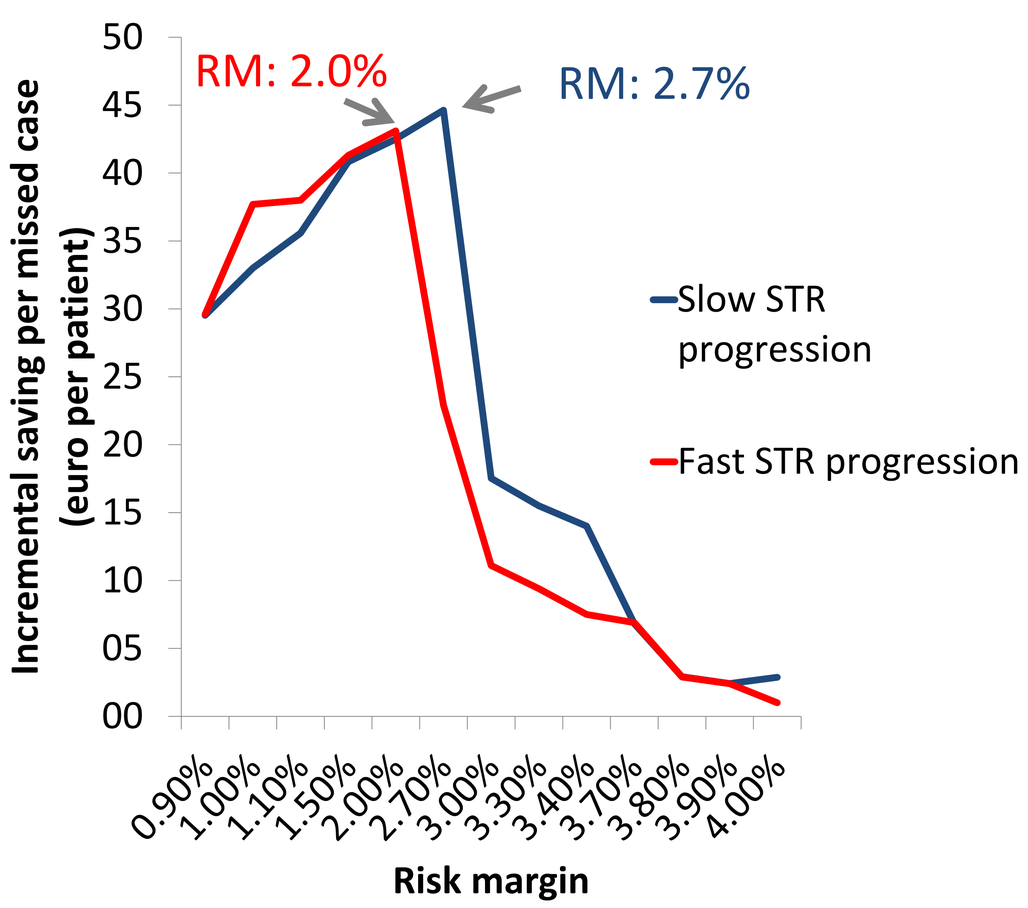

Figure 1: Optimal risk margins for two assumptions

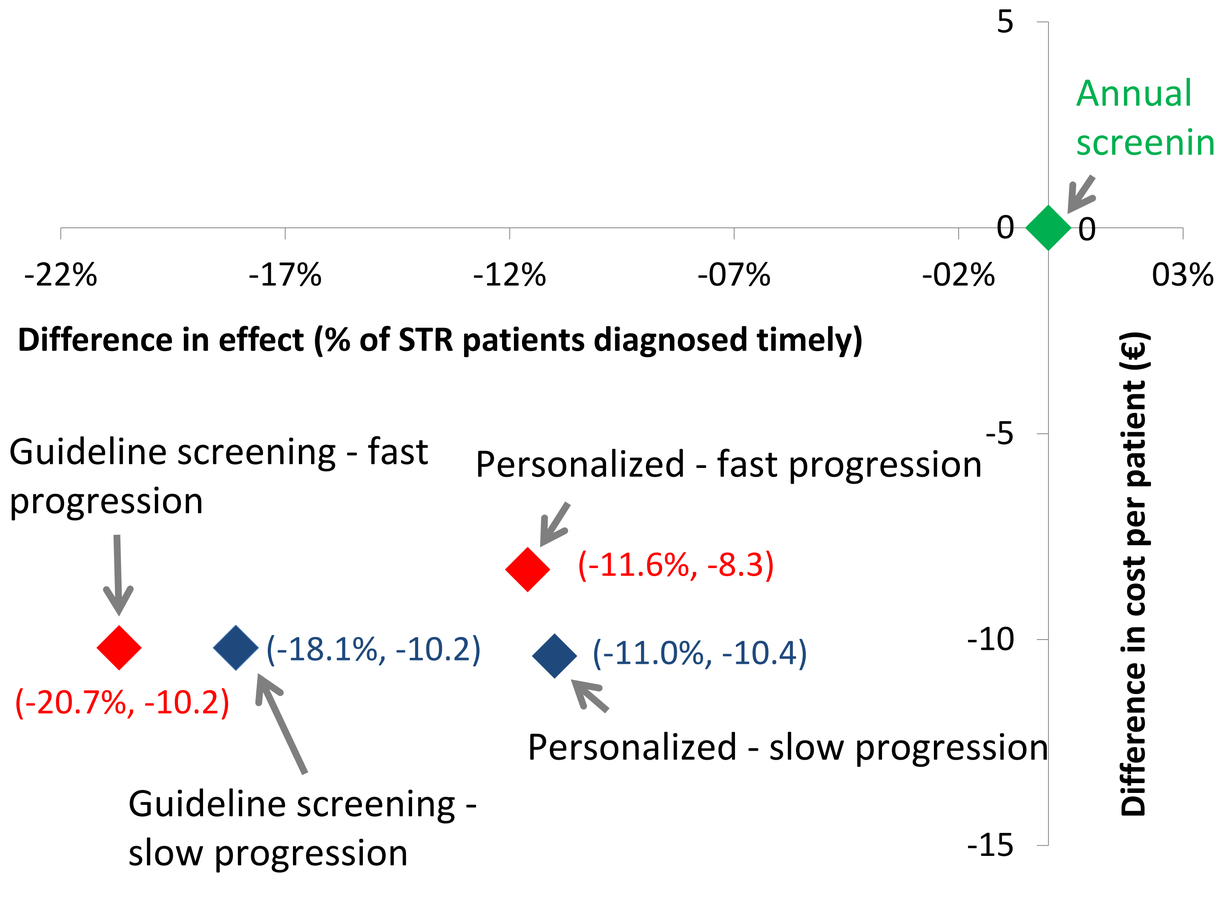

Figure 2: Cost-effectiveness plane: the personalized DR screening and the Dutch guideline compared with the annual screening

Conclusions

- The personalized DR screening strategy is **more** cost-effective than the Dutch guideline screening strategy
- Although the personalized DR screening strategy was **less** effective than the annual screening strategy, the number of late diagnosed STR patients is relatively low and the savings are **considerable**
- With around 800,000 diabetes patients in the Netherlands, implementing this personalized model could save **6.8 to 8.5** million euros annually compared to the annual screening, at the cost of **493 to 526** missed cases

[1]Aspelund et al. Individual risk assessment and information technology to optimise screening frequency for diabetic retinopathy. Diabetologia. 2011 Oct;54(10):2525-32.

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