The Case for Extended Screening Intervals for People with Diabetes and No or Minimal Retinopathy at Baseline

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The article by Modjtahedi et al[1] in this issue of *JAMA Ophthalmology* is noteworthy because it adds to a growing body of evidence that suggests that extending screening intervals to 2 years for those with no or minimal diabetic retinopathy (DR) at baseline may be safe and appropriate. There is an increasing need for screening intervals to be informed by evidence and tailored to risk, given the aging population and the growing burden of diabetes.

While this study is an important contribution to the field, in isolation, it does not provide sufficient evidence to support the case for biennial screening for the following reasons: (1) it is a retrospective study that captures intervention outcomes alone; (2) it is not clear whether patients seek treatment outside of the health network, in which case intervention outcomes may be underestimated; (3) because 2-year retinopathy severity data are not provided, it is unclear what proportion of people have retinopathy nearing the threshold for therapy; (4) 14.8% of participants were lost to follow-up, and because nonattendance is a risk factor for the complications of diabetes, it is possible that the rates of intervention reported in this study are underestimates of the true burden of sight-threatening disease; (5) the extent to which the study findings can be generalized to other populations is unclear because baseline characteristics of the study participants are not described in detail (key clinical variables, including duration of diabetes, hemoglobin A_{1c}, blood pressure levels, and comorbid complications of diabetes, are not provided); and (6) minimal retinopathy is not clearly defined. Other research has suggested that among those with minimal retinopathy (Early Treatment Diabetic Retinopathy Study, level 20), the risk of progression varies significantly according to the number of microaneurysms present.[2] Studies also indicate that the risk of progression to referable DR is significantly higher for those with mild and moderate nonproliferative DR (Early Treatment Diabetic Retinopathy Study, levels 20-35) in both eyes at baseline than in those with mild and moderate nonproliferative DR in 1 eye only.[3,4]

Other studies have explored the cost-benefit association between DR screening intervals and outcomes. Vijan et al[5] suggested in 2000 that annual screening for all patients with type 2 diabetes without previously detected retinopathy was not cost-effective, and tailoring recommendations according to patient age and glycemic control may be preferable. In 2015, Scanlon et al[6] examined the cost-effectiveness of personalized screening intervals, incorporating previous screening outcomes and commonly available baseline clinical data (eg, hemoglobin A_{1c}, cholesterol, and blood pressure). Extending screening intervals to every 5 years in the lowest-risk groups (ie, those with no DR in either eye at 2 annual screening episodes) and every 2 years for higher-risk groups (ie, those with mild nonproliferative DR in both eyes) was found to be cost-effective. It is important to note that in this population, the blood pressure and glycemic control was relatively good, and thus, these recommendations may not be appropriate for other populations where risk factor control is less optimal. A trial to validate the introduction of personalized screening intervals is underway in Liverpool, England.[7]

Personalization of screening intervals is likely to be further advanced with the widespread adoption of digital health records and data linkage across health domains. Artificial intelligence–assisted image analysis offers the potential of more accurate progression monitoring and prediction, which may eventually allow for more precisely tailored screening intervals. In the interim, further studies are warranted to understand the suitability of extended intervals in practice. As alluded to by Modjtahedi et al,[1] there is likely to be a tipping point at which compliance with screening falls off as screening

intervals extend because longer intervals may minimize perceived risk and thus patient engagement. The broader health care context is important in this regard: if a DR screening program is embedded in the health system, longer intervals are less likely to result in loss of participation. Experience in health systems where screening is ad hoc, such as in Australia, suggests that compliance with biennial screening is suboptimal.[8]

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