**Title:**

**Determining the Optimal Screening Interval for Type 2 Diabetes Mellitus Using a Risk Prediction Model**

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**Abstract**

**Background**

Progression to diabetes mellitus (DM) is variable and the screening time interval not well defined.

**Objective**

To develop a model to predict the probability of developing DM and suggest a risk-based screening interval.

**Methods**

Non-diabetic adults screened for DM in the Cleveland Clinic Health System with:

* First glycated hemoglobin (HbA1c) < 6.5% measured in 2008.
* Subsequent HbA1c measured between January, 2009 and December, 2013.

Cox proportional hazards models were created.

The primary outcome was DM defined as HbA1C greater than 6.4%. The optimal rescreening interval was chosen based on the predicted probability of developing DM.

**Results**

Of 5084 participants, 4.4% of the 2281 patients with normal HbA1c and 27.5% of the 2803 patients with prediabetes developed DM within 5 years. Factors associated with developing DM included HbA1c (HR per 0.1 units increase 1.20; 95%CI, 1.13 - 1.27), family history (HR 1.31; 95%CI, 1.13 - 1.51), smoking (HR 1.18; 95%CI, 1.03 - 1.35), triglycerides (HR 1.01; 95%CI, 1.00 - 1.03), alanine aminotransferase (HR 1.07; 95%CI, 1.03 - 1.11), body mass index (HR 1.06; 95%CI, 1.01 - 1.11), age (HR 0.95; 95%CI, 0.91 - 0.99) and high-density lipoproteins (HR 0.93; 95% CI, 0.90 - 0.95). Five percent of patients in the highest risk tertile developed DM within 8 months, while it took 35 months for 5% of the middle tertile to develop DM. Only 2.4% percent of the patients in the lowest tertile developed DM within 5 years.

**Conclusion**

A risk prediction model can be used to guide screening intervals. Patients in the highest risk category could be rescreened after 8 months, while those in the intermediate and lowest risk categories could be rescreened after 3 and 5 years, respectively.