

Predicting High Risk of Developing Type 2 Diabetes among Brazilian Adults

Bracco, Paula Andreghetto¹; Schmidt, Maria Inês¹; Vigo, Álvaro¹; Mill, José Geraldo²; Vidigal, Pedro Guatimosim³; Barreto, Sandhi Maria³; Sander, Mária de Fátima³; da Fonsca, Maria de Jesus Mendes⁴; Duncan, Bruce Bartholow¹.

Corresponding author: Paula A. Bracco (paula.abracco@gmail.com)

¹ Postgraduate Program in Epidemiology, School of Medicine, Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil

² Health Science Center, Universidade Federal do Espírito Santo, Vitória, Brazil

³ School of Medicine, Universidade Federal de Minas Gerais, Belo Horizonte, Brazil

⁴ National School of Public Health, Oswaldo Cruz Foundation, Rio de Janeiro, Brazil

Objectives: Diabetes can be prevented through screening for high-risk individuals. However, no readily accessible clinical prediction rule utilizing both clinical and laboratory data from a South American population is currently available. We thus aimed to develop and offer such a calculator.

Methods: We developed a web-based calculator based on a mean 7.4 (0.54) years of follow-up of the ELSA-Brasil, a contemporary cohort of 15,105 public servants aged 35-74. The input variables include age, BMI, sex, ethnicity, parental history of diabetes, waist circumference, presence of hypertension, and, if desired, fasting and 2h glucose, glycated hemoglobin, triglycerides, and HDL-c. We developed the rules with logistic regression.

Results: After exclusion of prevalent diabetes cases and missing information, our sample consisted of 9525 participants. Mean age at baseline was 50.5 years, 54.6% self-reported as white, and 57.1% were women. Our scores using continuously expressed clinical and laboratory variables produced a better balance between detecting more cases and labeling fewer false positives than currently recommended approaches. A score calibrated to detect a risk of future diabetes $\geq 20\%$, while labeling only 15% as high-risk, predicted 54% of future diabetes cases. In contrast, screening with fasting plasma glucose, while predicting more future cases, labeled 41% of the population as high risk.

Conclusion: The calculator, available at <https://paulabracco.shinyapps.io/ELSADMRisk/>, is available to predict 10-year diabetes risk in the Brazilian population. It permits a 2-stage approach of first testing without laboratory exams and then incorporating laboratory results in final screening for those at highest clinical risk. It represents an alternative to other approaches currently used in the region.

Keywords: Type 2 Diabetes, Online Screening Tool, Risk Prediction Score