

# The AI-based software with a digital non-mydratric camera provides an efficient tool for diabetic retinopathy screening

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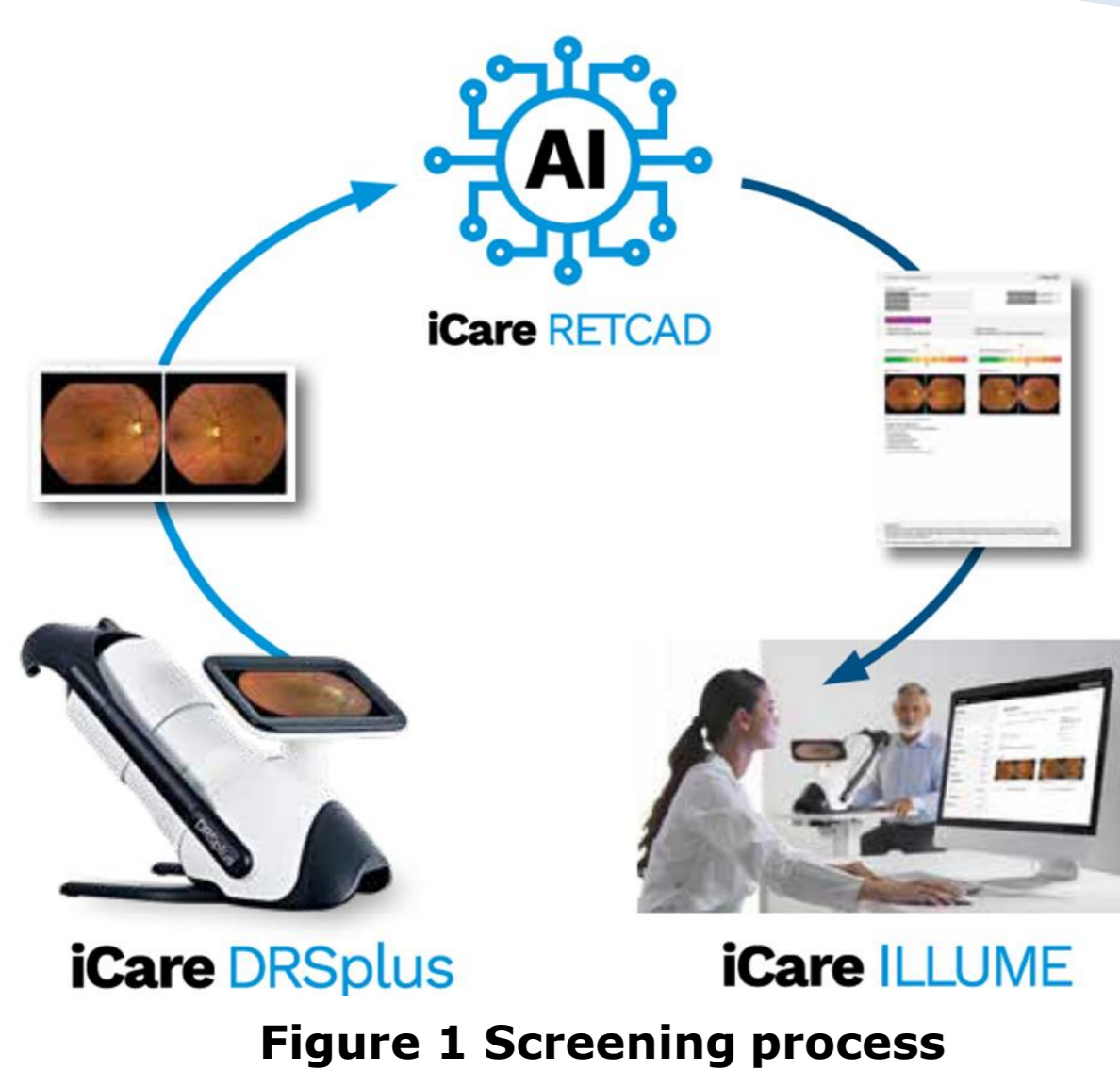


## Background

Diabetic retinopathy (DR), a leading cause of vision loss among diabetic patients, is a growing global health concern. According to the National Health Information Center, the prevalence of DR in Slovakia is 19%. However, only half of diabetic patients undergo regular ophthalmological examinations, highlighting the need for improved screening strategies. The use of AI-assisted non-mydratric fundus imaging during routine diabetes consultations has the potential to support and enhance ophthalmological screening through early DR detection.

## Aim

This study aimed to determine the occurrence of DR in a real-world diabetes outpatient clinic setting and evaluate the effectiveness of AI-assisted digital non-mydratric fundus imaging for screening DR in patients with type 2 diabetes mellitus (T2DM).



## Methods

A total of 755 adult patients with T2DM underwent routine fundus imaging during their diabetes consultation. Of these, 320 were women and 435 were men. The mean age of the study cohort was 54.6 years (range: 32–86 years). The mean diabetes duration was 8.6 years (range: 1–29 years). Fundus photography of both eyes was performed using the non-mydratric DRSpplus® fully automated digital camera featuring TrueColor Confocal technology (iCare, Finland). The images were analyzed with iCare RETCAD™ software **Figure 1**. For analysis, 694 patients (91.9%) met the image quality criteria, and both eyes were evaluated separately. All patients with were referred for ophthalmological assessment .

## Results

Among the 694 analyzed patients:

DR was present in 201 patients (29.0%), while absent in 493 patients (71.0%) **Figure 2**.

Breakdown of DR severity (International Clinical Diabetic Retinopathy Severity Classification): mild DR: 128 patients (18.4%), moderate DR: 62 patients (8.9%), severe DR: 7 patients (1.0%), proliferative DR: 4 patients (0.6%) **Figure 3**.

Statistical analysis demonstrated a significant association between longer diabetes duration and the presence of DR ( $p < 0.001$ ). Mean HbA1c was 8.1% (SD  $\pm$  1.3) in the DR group versus 6.9% (SD  $\pm$  1.1) in the non-DR group ( $p = 0.002$ ). This suggests that patients with DR have significantly poorer metabolic control.

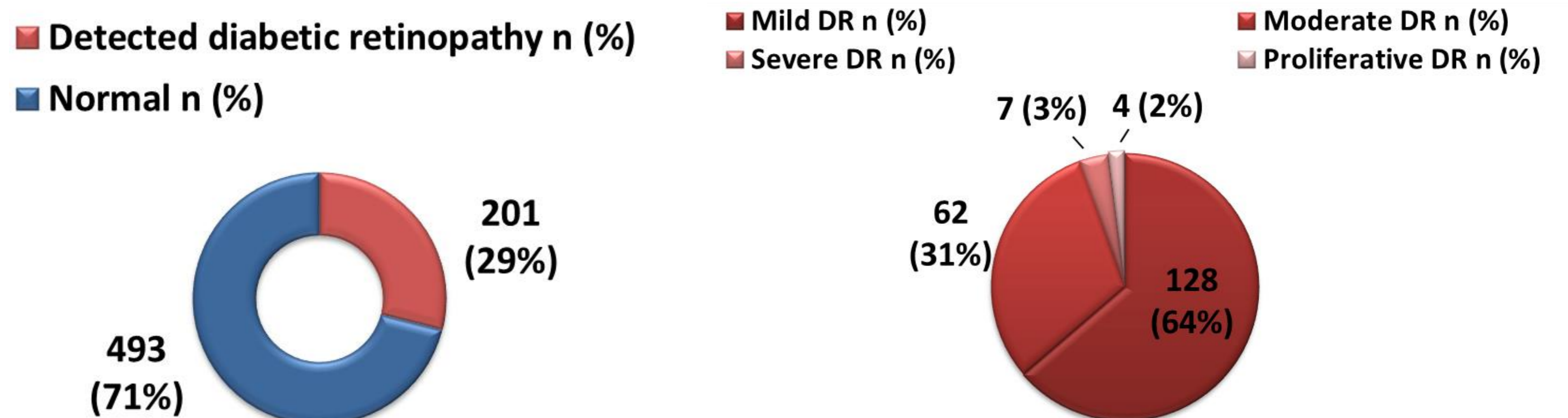


Figure 2 Diabetic retinopathy in T2DM, n (%)

Figure 3 DR in T2DM, ICDR severity classification, n (%)

## Conclusion

Our findings confirm that AI-assisted non-mydratric fundus imaging is an effective tool for early DR detection. In routine diabetes consultations, this method enables a quick and efficient examination, which can significantly contribute to promoting ophthalmological check-ups and early DR detection, particularly in settings where only half of patients currently attend regular eye screenings. The reported prevalence of DR is 19%, whereas our screening identified 29% of patients with DR of varying severity, highlighting a significant disparity in detection rates. Implementing this technology in routine diabetes care enhances screening rates, supports timely clinical interventions, and facilitates better metabolic control to prevent DR progression.

**The findings revealed a difference between the known prevalence of DR and the prevalence detected when every diabetic patient is screened.**

**Our results show that one-third of DR cases remain undetected when only those attending ophthalmological check-ups are considered.**

## Acknowledgment

This project was supported by **Icare Finland Oy**, the **University Students Grant Program by Tatra banka Foundation, Slovakia**, and **Dôvera Health Insurance Company, Slovakia**, as part of the grant program "Fighters for Health".

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