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Mass screening for diabetic retinopathy based on artificial intelligence algorithms in the primary care setting

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Background: Currently, less than 50% of patients with type 2 diabetes (T2DM) attend eye screening services in Europe. We think that a screening method closer to the patient based on artificial intelligence (AI) algorithms, carried out with a smartphone and with the participation of primary care will increase the rate of patients examined and detect DR in its early stages. **Methodology:** We have built two complementary AI algorithms to be applied to type 2 diabetic (T2DM) patients; an automated reading system (ARS) for classifying the retinographies and a clinical decision support system (CDSS) which estimates the risk of developing DR according to nine clinical variables: sex, age, HbA1c, duration of diabetes, diabetes treatment, arterial hypertension, hemoglobin, glomerular filtration rate, microalbuminuria and body mass index. The algorithms have been trained, validated and tested in a sample of more than 100,000 patients extracted from our reference diabetic population, MESSIDOR and EyePACS. Our project consists of validating a new platform using a smartphone instead of fixed cameras with which to apply eye screening anywhere. **Results:** The results of testing the ARS with the standard fundus cameras to identify any type of DR in T2DM patients were: accuracy (ACC)=99.75, sensitivity (S)=97.92%, specificity (SP)=99.91% and area under de curve (AUC)=0.983 while when testing the CDSS the results yielded: ACC=0.876, S=84%, SP=88.5%, type I error=0.115 and type II error=0.16. The ongoing project aims to compare the accuracy of the smartphone in detecting any type of DR compared to the fundus cameras in order to subsequently implement this system in primary care. **Conclusions:** Our algorithms performed well when applied to T2DM patients. The implementation of the new platform in the primary care setting will allow the evaluation of more T2DM patients and detect DR in its early stages.

Biography

Marc Baget is an ophthalmologist specialized in Retina. His main areas of interest are diabetic retinopathy, uveitis and artificial intelligence applied to healthcare. He has collaborated in the implementation of telemedicine for eye screening in diabetic patients in Spain. He is an associate professor of Ophthalmology at the University Rovira I Virgili and works as a researcher at the Institut Investigacions Sanitàries Pere I Virgili. (IISPV).