Pilot artificial intelligence-based diabetic retinopathy screening program in Poland

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I have/had an affiliation (financial or otherwise) with a commercial organization that may have a direct or indirect connection to the content of my presentation.

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<td>Grant/Research support</td>
<td>Alcon, Pfizer</td>
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SUMMARY

• The aim of the study was to implement a DR screening project based on AI on a local level in Poznan, Poland.

• IDx-DR was able to analyze 78% of 450 screening episodes.

• Among the patients analyzed, according to the single clinician reference standard, IDx-DR had 94% sensitivity and 95% specificity.

• The percentage of poor quality images decreased with staff training and experience with both the fundus camera and the software.

• The final almost 80% nonmydriatic imaging rate was deemed satisfactory.
INTRODUCTION

• Prevalence of DR is expected to increase -> put an increasing strain on health care resources.

• Only a few countries were able to develop national DR screening programmes, due to sheer financial cost, personnel and organisational capabilities required.

• Autonomous, deep-learning based systems for DR detection may help alleviate the strain on healthcare resources

• The cost reduction associated with AI DR screening solutions might make it possible to implement screening on a wider, local and later national level
OBJECTIVE

• To implement a DR screening initiative based on AI on a local level in Poznan, Poland
METHODS

• Population - adult patients who visited a diabetic clinic in Poznan, Poland for their appointments

• Non-mydriatic retinal images captured by diabetic nurses, assisted by an image quality AI, and subsequently diagnosed by the IDx-DR screening system

• Based on the AI system output – **ICDR negative** (no DR or only mild DR and no DME), **moderate retinopathy, vision-threatenining retinopathy** (severe NPDR, PDR and/or DME), they are recommended **another screening after 1 year**, routine or urgent ophthalmology referral respectively

• Patients’ whose image quality is still deemed insufficient by IDx-DR after re-imaging are advised to visit an ophthalmologist.

• At this stage of the study **all images are later reviewed by a single ophthalmologist**
initially the program was hindered by numerous obstacles related to locale, hardware, staff training and public perception issues - quickly alleviated

IDX-DR was able to analyze 78% of screening episodes vs 82% judged sufficient by a human grader

RESULTS

IDX-DR output – 450 patients

- Low Quality: 278
- DR Positive: 76
- DR Negative: 96

Results after single-clinician grading

- Low Quality: 61%
- True negative: 14%
- True positive: 21%
- DR Positive: 3%
CONCLUSIONS

• The DR-screening process with IDx-DR for the image-analysis was easy to implement and use.
• We have reached the level of about 80% of screening episodes being analysable only after additional staff training.
• According to the single clinician standard the sensitivity and specificity for the images with acceptable quality were 94% and 95% respectively.
• IDX-DR can be used as an autonomous screening device (without clinician oversight).