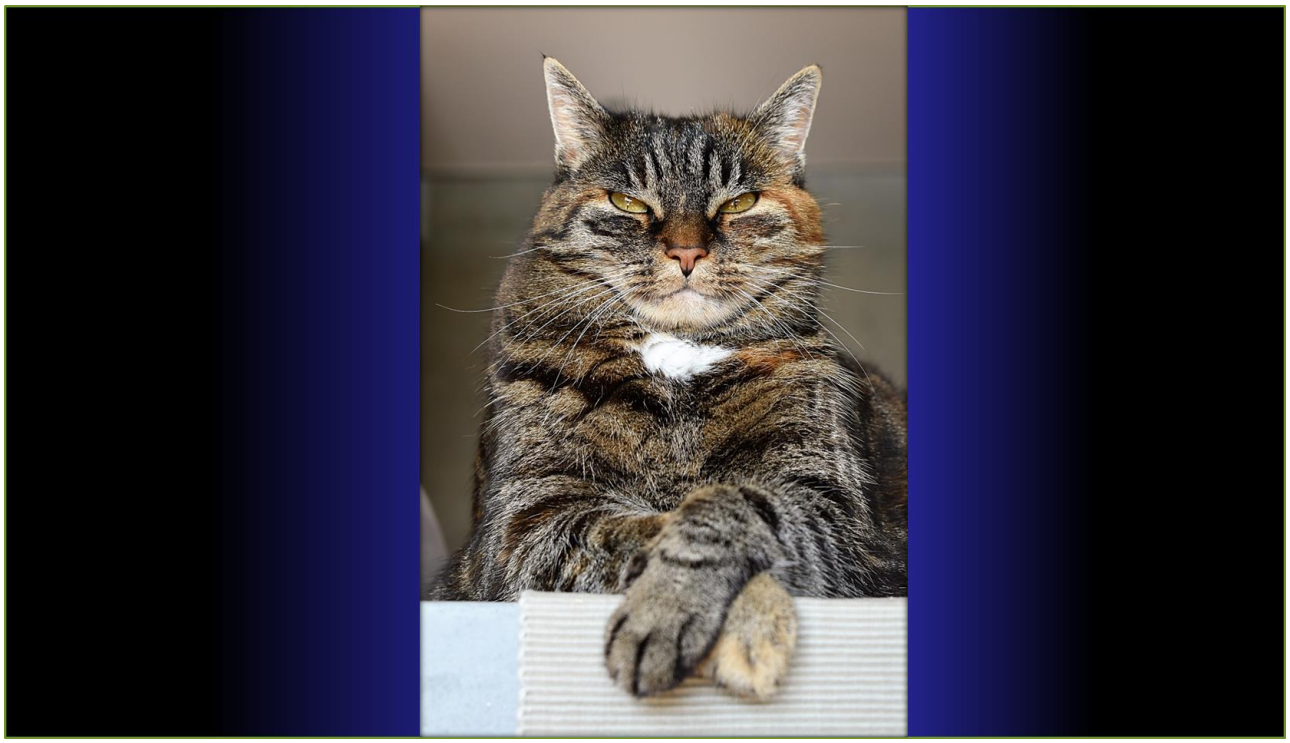
I & Vision Research Centre

Tech in Diabetic Eyecare – Zero Trust and a Zero Judgment model?



Credit: Pixabay. Bexacat pills were approved in 2022 for glycemic control in feline diabetes. Cats rarely trust and often judge

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Diabetes remains a leading cause of preventable blindness worldwide. Projections into 2045 are dire, but perhaps some optimism is due. Improved food or nutraceutical quality, lifestyle choices, public education, and knowledge about the molecular mechanisms for therapeutic targeting mean the figures are not foretold so much as forewarned. Reducing case numbers of diabetes mellitus, continuous improvement in early diagnosis, and a drop in the prevalence of diabetic retinopathy and other complications is possible though research, technology, and national health initiatives (See Teo *et al.* 2021). These are advancing rapidly, contributing to our existing techniques and resources.

Example: For several years, a cornerstone of diabetic management has been 'tight glycemic control': reducing spikes and variation in blood sugar to control damage to blood vessels. Researchers at Johns Hopkins (Guo *et al.* 2023) investigated why this can paradoxically increase damage in early treatment stages and uncovered a pathway of HIF-1α related to hypoglycemia. While the study was focused on eye disease, the team states that knowledge of the mechanism and new therapeutic target has implications for glucose management as a whole.

Another example: Diabetic kitties now have access to FDA-approved (and flavoured, but luckily not FDA-flavoured) pills instead of injections and dieting. Dieting is still advised for the epidemic of morbidly obese diabetic pets in the developed world, though.

Rather predictably a lot of initiative is focused on making the most of artificial intelligence and moving beyond the traditional clinic model. One of the presentations at ARVO 2023 featured a study using MONA AI software for diabetic eye disease referrals, which demonstrated high accuracy in detection, also reducing the appointment workload of eye doctors by enabling the quick scan to be performed by a nurse or technician and the AI instead. Our network of practitioners wonders if the absence of a doctor from the routine 3-minute screening exam removes a shame and judgment component that makes the elderly and women more likely to attend (pattern reported in DeFino, 2023). In this grain, fundus and retinal photography from smartphones as diagnostic images are another dimension ripe for expansion and keeping up with an appointment schedule (See Iqbal, 2021; Hui, 2022).

However, new healthcare approaches are still imperfect for many reasons, and the data needs 'treatment' too. It isn't a simple process to harvest factors of interest from non-compatible records. When talking about imaging devices, a tidy-up for clarity and algorithm processing is required if using a smartphone or patient self-captured diagnostics (Chandhakanond & Aimmanee, 2022). Even with clinical images analysed by dedicated healthcare software, there is a reduction in accuracy for the eyes of patients over 65 as well as certain subgroups (Peeters *et al.,* 2023). Meaning: Extra caution and steps must be written in at the clinic level to ensure quality of care and accuracy. Or: Additional calculations in the software are required to specifically cater to the more complex and comorbid cases common in older eyes and to include ethnicity as an individual risk factor (Teo *et al.*, 2021).

Security is another aspect, where patient data has to be protected from hackers and a whole swathe of cyberthreats (Nielsen *et al.* 2022; Rodriguez, 2023) as well as the data-gathering companies themselves (McCulloch *et al.* 2023). The labour-crunch the healthcare industry is facing therefore applies not just to medical, but qualified metadata-tidiers and cybersecurity professionals that have to ensure everything runs smoothly, ethically, and economically.

We also have to point out that if patient data is used for large-scale national or regional programmes, and in addition to that utilises a remote or app-based model, the security risks magnify. There are definite tradeoffs when it comes to epidemiological and technology-based approaches. As such, they may not be the appropriate investment for every demographic, condition, or organisation.

Disclaimer: *The material presented is for informational and entertainment purposes only, in summary of recent news and events. It neither reflects the views nor constitutes professional advice of the organisation. The major sources used are referenced below.*

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About MONA AI: **https://mona.health/home-light/**