MEDIA FACT SHEET ON INTELLIGENT EYE TRIAGING SYSTEM

Background on Current Referral Processes to SNEC

- Each year, the Singapore National Eye Centre (SNEC) attends to over 300,000 specialist outpatient clinic appointments[1], with most referrals coming from primary care settings, such as SingHealth Polyclinics (SHP).

- Presently, patients who present with symptoms of eye conditions at primary care settings will undergo an initial eye check-up, which includes an assessment of their visual acuity. During consultation, the primary care doctor will assess their condition and test results. If further assessment by a specialist is required, the patient will often be referred to a general ophthalmologist depending on the initial diagnosis and the urgency of referral.

- This process sometimes results in unnecessary specialist appointments and "dwell time" for patients and their caregivers at SNEC.

Using Machine Learning to Triage Ophthalmology Patients in Primary Care Settings

- To address this, a team of clinician innovators and healthcare researchers from SNEC, Singapore Eye Research Institute (SERI) and the Institute of High Performance Computing (IHPC) have developed the **Intelligent Eye Triaging System**, which uses machine learning[2] to triage patients who present with symptoms of eye conditions at the primary care settings.

- Piloted at SHP-Outram since January 2022, the system leverages multiple features such as patient symptom assessment that are carried out at the polyclinic **to provide a working diagnosis of the eye condition, indicate the urgency of referral** based on severity, as well as **recommend further follow-up tests** such as visual acuity and intra-ocular pressure.

[1] SingHealth Duke-NUS AMC Annual Report 2021/2022
[2] Machine learning is a subfield of artificial intelligence that focuses on the use and development of computer systems that draw inferences from patterns in data without explicit instructions.

- The following example demonstrates the patient's improved journey with the Intelligent Eye Triaging System:

i. Patient who presents with symptoms of eye conditions at SHP-Outram will be required to answer a questionnaire in the Intelligent Eye Triaging System (hosted on a tablet provided by the polyclinic). The questionnaire includes questions about a patient's personal information and the symptoms which he is experiencing.

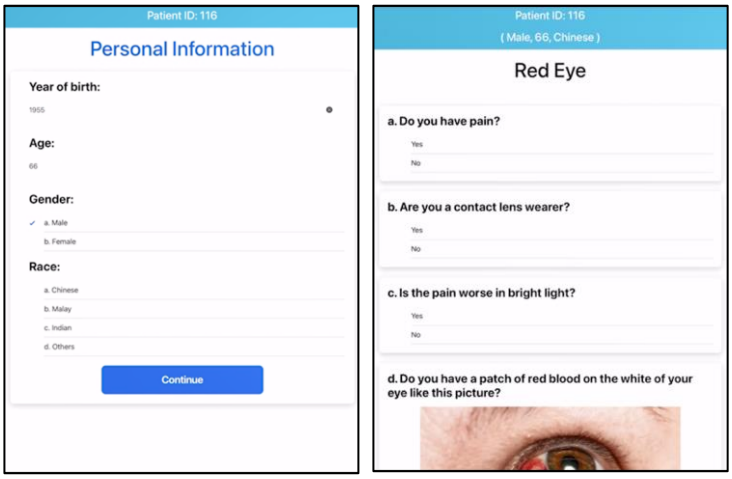

Fig. 1 Screenshot of questionnaire in the Intelligent Eye Triaging System

ii. Based on the responses, the system may prompt the patient to undergo additional eye tests, such as visual acuity and intra-ocular pressure measurements, performed by a nurse. The results will then be input into the system.

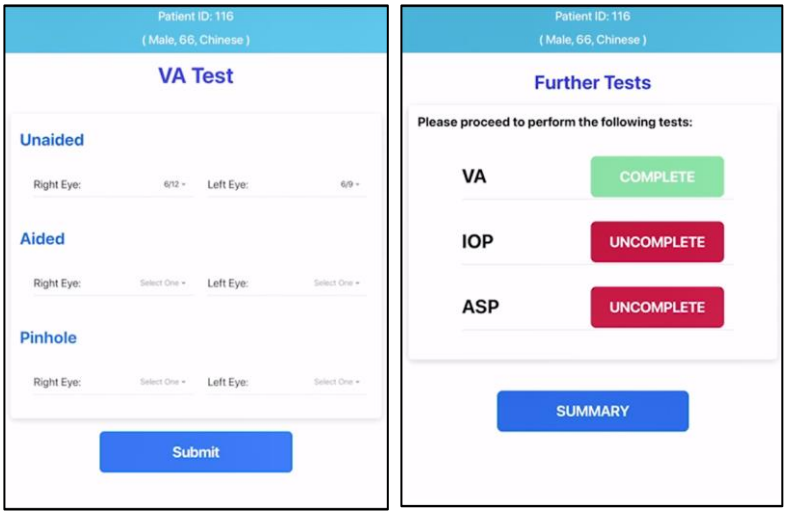

Fig. 2 Follow-up test recommendations and prompts by the Intelligent Eye Triaging System

iii. The questionnaire is part of an algorithm which is refined using machine learning to assess the patient's eye results and provides a working diagnosis and score on the urgency of the patient's condition.

iv. The information generated from the working diagnosis, referral urgency, and test results (if any) will be made available to the doctor, providing structured information that is especially useful for junior doctors who may have limited exposure to eye conditions.

v. During the patient's consultation, the SHP doctor can review the information and choose to follow or override the eye triaging system's recommendation based on his clinical assessment of the patient.

vi. If the patient is referred to an eye specialist, a referral letter will be generated and patients will be directed to the SHP referral counter to make an appointment at SNEC.

Key Benefits of the Intelligent Eye Triaging System

1. Greater accuracy in referrals

    - While some cases can be handled at the primary care setting, the more urgent cases may need timely specialist follow-up. The system can assist primary care doctors in making the decision on whether a patient requires a specialist referral. Based on pilot results, the accuracy of referrals to eye specialists have increased from 42% to 60%.

2. Enhanced patient and caregiver experience

    - As patients can receive more accurate referrals at the primary care setting, this helps to reduce the number of unnecessary specialist visits, reducing the time spent at the specialist centre.

3. Time savings for the primary care doctor

    - The system helps primary care doctors to assess patients' test results and make a working diagnosis more efficiently. This saves time during consultation, allowing them to work more efficiently and focus on other important areas of clinical and patient care work. This improves productivity and optimises healthcare resources.

Most importantly, the system helps to facilitate early clinical intervention that can optimise clinical outcomes for patients.