# QI Project: Optimization of preoperative cardiac assessment guideline and cardiology referral workflow for elective surgery in the Singapore General Hospital

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**Aim:** Patients scheduled for surgeries have to undergo preoperative assessment and optimisation. Due to ageing population with concomitant age-related comorbidities, a significant proportion of patients are identified to have potential cardiac issues. In the Singapore General Hospital (SGH) Preoperative Assessment Clinic (PEC), an average of 47 preoperative cardiology referrals are made monthly. However, issues such as inappropriate cardiology referral, insufficient referral information, and the need for multiple cardiology outpatient visits resulted in surgery delays in up to 30% of these patients. We therefore aim to optimize preoperative cardiac assessment process and cardiology referral workflow in our centre.

**Methodology:** The team examined and ranked multiple root causes that resulted in a high proportion of delayed surgeries due to preoperative cardiac assessment. We subsequently brainstormed possible solutions to address these root causes, and selected a few solutions using a prioritisation matrix. A structured workflow for preoperative cardiology referral was implemented in SGH in April 2021. This workflow included multiple solutions such as consistent referral criteria, introduction of an electronic referral module, streamlined appointment acquisition process, and direct discussion between cardiologists and anaesthetists to avoid multiple outpatient visits preoperatively. Details of patients referred to cardiology pre-and post-implementation between July 2020 and July 2021 were extracted and compared.

**Results:** Post-implementation, there was a reduction in the rate of PEC preoperative cardiology referrals from 3.4% to 2.8% ($p$=0.026), equating to a reduction of about 144 referrals per annum. In addition, implementation of the streamlined referral guideline led to fewer inappropriate referrals by 12%, based on 50 randomly-sampled cases pre- and post-implementation. These reductions can be extrapolated to an estimated annual cost saving of S$74,045. Although the percentage of patients being reviewed by cardiology within 2 weeks of referral was not significantly different, the number of patients requiring more than one cardiology consults was reduced from 39% to 26% ($p$=0.002). Finally, the number of surgeries delayed due to preoperative cardiology review was reduced from 30% to 17% ($p$=0.0004).

**Conclusion:** A structured workflow and streamlined guideline for preoperative cardiology referral can reduce the number of elective surgeries delayed, number of cardiology reviews and number of inappropriate referrals. Ultimately, these can aid in prioritisation of healthcare resources, reduce healthcare costs and improve patient satisfaction. The team will work with surgical subspecialties to scale up the project initiatives.