Screening methods: stool, scope or others?

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Despite high likelihood of cure when diagnosed at an early stage, colorectal cancer (CRC) remains the second leading cause of death from cancer in many countries. Early diagnosis has a major impact on survival and can be achieved with regular screening. However, screening can only be effective with achieving a reduction in mortality if the test is both accurate and acceptable to the target population.

There are a number of CRC screening techniques that are either currently in use or under investigation, including colonoscopy, flexible sigmoidoscopy, faecal occult blood tests (FOBT- guaiac or immunochemical based), stool DNA tests and blood tests (including protein, DNA, epigenetic DNA, mRNA and miRNA biomarkers).Many of these screening tests are considered “two-step screening”, where the test selects participants at a higher risk of cancer who can then proceed to diagnostic investigation by colonoscopy. Mortality reduction of CRC through screening is achieved by earlier detection at more readily cured stages, while a reduction in disease incidence is achieved by removal of adenomas. In considering any test for implementation into a screening program, sensitivity for both CRC and adenoma should therefore be considered. In addition, as colonoscopy workload is determined by the test positivity rate, screening test specificity in the target population must also be established. With quantitative screening tests, one can set the positivity threshold to a desired sensitivity or specificity, and to manage colonoscopy follow-up rates.

As detection of cancer in a population is the product of test sensitivity and participation, improving participation is just as important as improving accuracy. Low participation rates in screening remains a problem with one study reporting only 29% of people having screening colonoscopy in the last decade, and another study showing participation rates ranging from 7-68% in FOBT screening programs. Poor participation with screening colonoscopy may be explained by its invasive and inconvenient nature, high cost, and its limited availability, while poor participation with FOBT may be due to dislike of faecal sampling, and contraindication due to non-neoplastic colonic bleeding conditions. New screening tests with different sampling modes might overcome some of the behavioral barriers inherent with colonoscopy and faecal testing, with initial evidence pointing to the likelihood of better participation with blood tests.

If screening is to achieve its full potential in reducing the population burden of CRC, we must improve both accuracy and participation. The aim of this work is to highlight the issues applicable when choosing a screening test, with a focus on sensitivity for CRC and adenomas, specificity, participation rates and testing frequency.