

## **Family History Screening to Detect Increased Risk for Colorectal Cancer: Conceptual and Economic Considerations**

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**Background:** Family history screening is a potentially valuable tool for reducing the burden of colorectal cancer. Although the epidemiological and biological rationale for earlier screening of persons with a suggestive family history is plausible, there is no direct evidence that earlier screening is either effective or cost-effective.

**Objective:** To develop a simulation model estimating the clinical and economic impact of using family history screening to identify persons who would undergo colorectal cancer screening before age 50.

**Methods:** Prior to developing a model, one must consider how colon cancer may develop differently in those with a family history vs. those without. Important considerations include the risk of developing pre-cancerous polyps and the rate of progression of polyps to invasive cancers. This information is used to guide the onset of family history screening criteria and the screening schedule for those who meet criteria for higher risk. We developed a decision model to compare costs and outcomes for 2 scenarios: (1) standard population screening starting at age 50; (2) family history screening at age 40, followed by screening colonoscopy at age 40 for those who screen “positive.” Patients with “negative” family histories begin screening at age 50. Base case estimates for input parameters were set using assumptions favorable to family history screening, with the goal of determining whether screening would be cost-effective under “ideal” conditions. The analysis was conducted using the health insurer perspective. Discounting was applied to future costs and benefits.

**Results:** Using U.S. population estimates, 11.2 million 40 year olds would be eligible for family history screening. Approximately 1 million would be eligible for early colonoscopy. The annual program cost would be \$1.14 billion. 2,834 invasive cancers would be prevented compared to standard population screening, and 28,339 life years would be gained from the intervention. The Cost/LYG of family history screening vs. no screening is \$40,105. In one way sensitivity analysis, the results were most sensitive to the life expectancy benefit afforded by earlier screening, the cost of colonoscopy, and the probability of invasive colon cancer developing in at-risk persons between the ages of 40 and 50.

**Conclusions:** Under idealized conditions, family history screening may be cost-effective, but program costs are substantial. The absence of information from high quality trials documenting the benefits of earlier cancer screening is a major issue confronting family history screening. Such trials would be feasible in a 40-50 year old cohort, and should be undertaken before investing in national programs to increase family history screening for increased susceptibility to early onset colorectal cancer.