

# Cost-effectiveness of targeted endoscopic screening for esophageal adenocarcinoma and Barrett's esophagus

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## Background

Screening for esophageal adenocarcinoma (EAC) and its precursor Barrett's esophagus (BE) is recommended for individuals with EAC associated risk factors, such as gastroesophageal reflux disease (GERD), male sex and white race. This study aimed to evaluate the cost-effectiveness of endoscopic screening for EAC and BE considering these risk factors in the US population.

## Methods

The Microsimulation Screening Analysis (MISCAN) model of EAC calibrated to the Surveillance, Epidemiology, and End Results data, was used. Four hypothetical cohorts of 40-year-old black and white US men and women were simulated and followed over their life-time. For each cohort, three strategies were modeled: (1) no-screening with treatment limited to symptomatic EAC, (2) individuals with GERD received one-time screening at age 60, (3) all individuals received one-time screening at age 60. In both latter strategies, individuals diagnosed with BE or EAC at screening received surveillance and/or treatment.

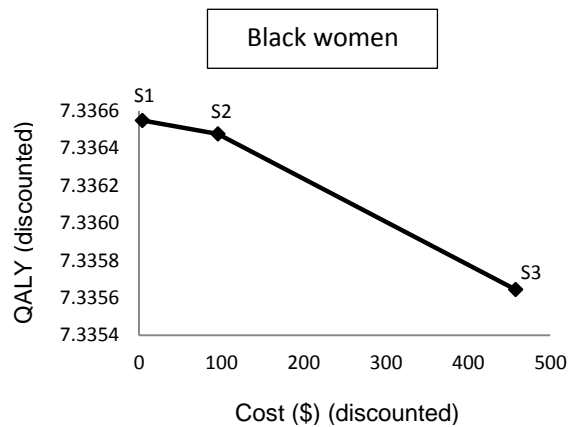
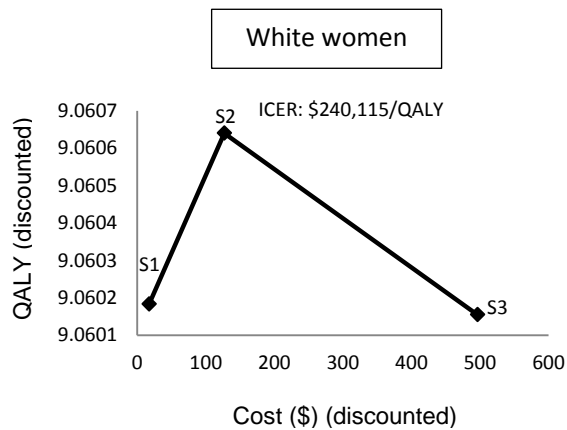
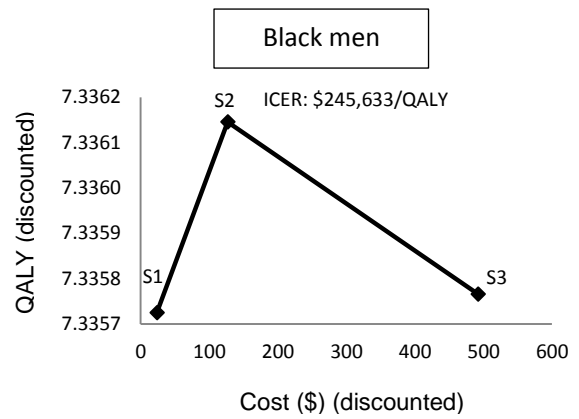
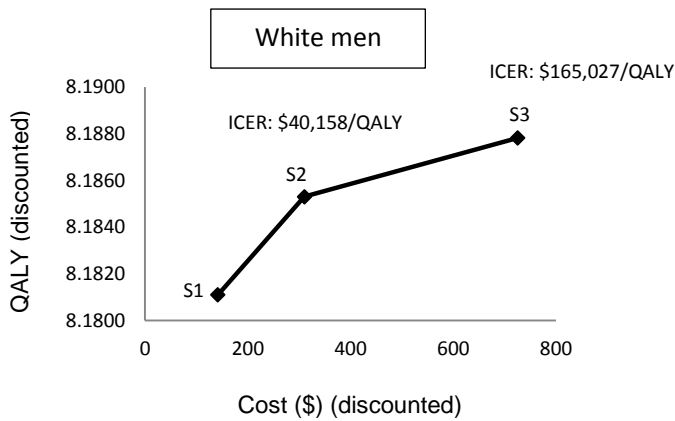
## Results

The EAC incidence in all cohorts decreased by 29-32% and 50-55% when screening only individuals with GERD and screening all individuals, respectively, compared to no-screening. Despite the substantial reduction in incidence, one-time screening at age 60 of all individuals was not cost-effective in any of the four cohorts at willingness-to-pay threshold of \$100,000 per quality-adjusted life-year (QALY). One-time screening of just individuals with GERD was only cost-effective in white men (incremental cost-effectiveness ratio = \$40,158 per QALY). In black women, screening for EAC and BE resulted in a decrease in QALY in the population, because the gains in QALY from prevented EAC were offset by the burden of endoscopies (Appendix 1).

## Conclusions

Endoscopic screening for EAC and BE in the general population may not be cost-effective unless individuals have multiple concurrent risk-factors associated with EAC including GERD, white race and male sex. If these factors are not considered, the harms of the screening may outweigh its health benefits.

**Keywords:** cost-effectiveness, targeted screening, Barrett's esophagus, esophageal adenocarcinoma



**Appendix 1.** Total cost and quality-adjusted lifer-years (QALY) per person by screening strategy (S1: no-screening, S2: individuals with GERD received one-time screening at age 60, and S3: all individuals received one-time screening at age 60) in cohorts of black and white US men and women. Incremental cost effectiveness ratios (ICERs) are reported for effective strategies. In white women and black men, S3 was dominated by S2 and in black women, both screening strategies 2 and 3 were dominated by no-screening.