# Supplementary Online Content

Earnshaw SR, Scheiman J, Fendrick AM, McDade C, Pignone M. Cost-utility of aspirin and proton pump inhibitors for primary prevention. Arch Intern Med. 2011;171(3):218-225.



This supplementary material has been provided by the authors to give readers additional information about their work.

**eAPPENDIX**

**Costs**

Healthy men with and without previous gastrointestinal bleed incurred one outpatient physician visit per year. Acute event health states (angina, myocardial infarction, stroke, and gastrointestinal bleed) included the cost of hospitalization for the respective event as estimated from Healthcare Cost and Utilization Project, Nationwide Inpatient Sample, which contains a national representative sample of hospital inpatient stays. The Healthcare Cost and Utilization Project, Nationwide Inpatient Sample is compiled by the Agency for Healthcare Research and Quality and contains a national representative sample of hospital inpatient stays for a variety of International Classification of Diseases 9th Revision, Clinical Modification and Healthcare Common Procedure Coding System codes. Men in these health states incurred one annual outpatient physician visit and post-event costs for the remaining 11 months within the health state. Annual costs for post-event health states (post angina, post myocardial infarction, and post stoke) were obtained from published literature. Once a man had a cardiovascular disease event, he was assumed to have four additional visits a year. Cost of generic aspirin (81 mg per day) and omeprazole (20 mg per day) were estimated from publicly available drug store pricing (www.Walgreens.com). Details on costs are presented in eTable 1.

## Utilities

The utilities for the model were drawn from the literature and are shown in eTable 1.[1-6]

## Results

Results are presented in eTable 2 and eFigures 1 through 8. Acceptability curves for aspirin +PPI versus aspirin alone were not shown for 45 year old and 65 year men because no incremental cost-effectiveness ratios between 0 and $50,000 were generated as within the probabilistic sensitivity analyses.

## REFERENCES


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**eTable 1. Cost and Utility Parameters, Values, and Plausible Ranges**

| Parameter | Base-Case Value (Range) | Source or Assumption |
|---|---|---|
| Cost Data (annual) | | |
| Aspirin | $13.99 | 81 mg daily[7] |
| Generic PPI | $199.79 | 20 mg of omeprazole daily[7] |
| Outpatient physician visit | $62.76 | CPT code 99202[8,9] |
| Health State Costs (Annual) | | |
| Healthy | $62.76 | Assumed to be 1 outpatient physician visit a year |

| | | |
|---|---|---|
| Gastrointestinal bleed | $13,342 | Gastrointestinal bleed ICD-9 codes: 531.00, 531.01, 531.20, 531.21, 532.00, 532.01, 532.20, 532.21, 533.00, 533.01, 533.20, 533.21, 534.00, 534.01, 534.20, 534.21, 535.01, 535.11, 535.21, 535.31, 535.41, 535.51, 535.61[10-12] |
| Post gastrointestinal bleed | $62.76 | Assumed to similar to healthy patient |

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**eTable 1 (continued). Cost and Utility Parameters, Values, and Plausible Ranges**

| Parameter | Base-Case Value (Range) | Source or Assumption |
|---|---|---|
| Angina | $13,372 | Angina ICD-9 codes: 413.9[10-12] |
| Post angina | $5,993 | 12,13 |
| Stroke | $21,706 | Stroke ICD-9 codes: 430.xx, 431.xx, 433.01, 433.11, 433.21, 433.31, 433.41, 433.51, 433.61, 433.71, 433.81, 433.91, 434.01, 434.11, 434.21, 434.31, 434.51, 434.61, 434.71, 434.81, 434.91, 436.xx[10-12] |
| Post stroke | $1,835 | 1,12 |
| Myocardial infarction | $32,625 | Myocardial infarction ICD-9 codes: 410.xx[10-12] |
| Post myocardial infarction | $3,590 | 1,12 |

**eTable 1 (continued). Cost and Utility Parameters, Values, and Plausible Ranges**

| Parameter | Base-Case Value (Range) | Source or Assumption |
|---|---|---|
| Utility Data | | |
| Healthy | 1.000 | 1 |
| Gastrointestinal bleed | 0.94 (95% CI: 0.880, 1.000) | 2 |
| Post gastrointestinal bleed | 1.000 | Assumption |
| Dyspepsia | 0.996 (95% CI: 0.997, 1.000) | 3 |
| Angina | 0.929 (95% CI: 0.923, 1.000) | 4 |
| Post angina | 0.997 (95% CI: 0.997, 1.000) | 4 |
| Stroke | 0.610 (95% CI: 0.480, 0.830) | 2 |
| Post stroke | 0.830 | 5 |
| Myocardial infarction | 0.870 (95% CI: 0.820, 0.920) | 6 |
| Post myocardial infarction | 0.910 (95% CI: 0.860, 0.960) | 6 |
| Healthy | 1.000 | 1 |

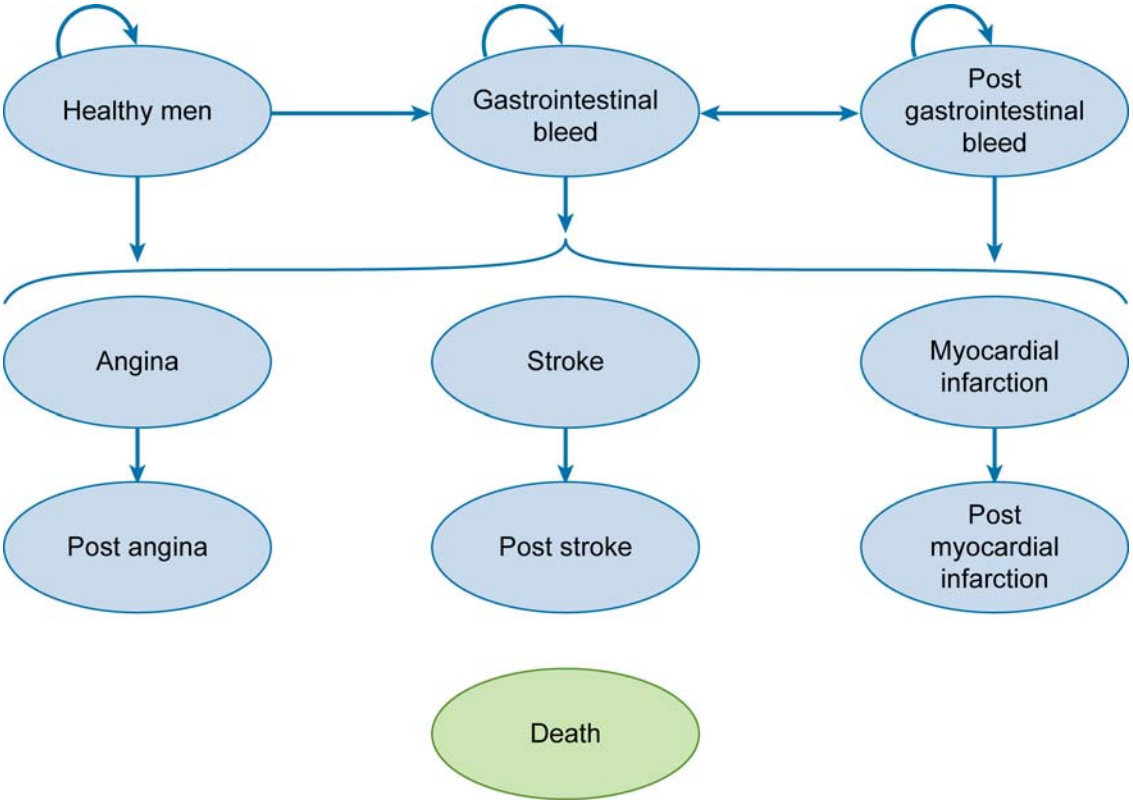
CI = confidence interval; CPT = current procedural terminology; HCUP = Healthcare Cost and Utilization Project; ICD-9 = International Classification of Diseases, 9th Revision, Clinical Modification; PPI = proton pump inhibitor.

**eTable 2. Effect of 10-Year CHD Risk on Lifetime Cost-Utility Ratio for 45-Year-Old Men Using Risk of MI and Stroke From Berger et al. (2006)**

| | Low (2.5%) Risk | Low-Moderate (5.0%) Risk | Moderate (7.5%) Risk | High-Moderate (10%) Risk | High (15%) Risk | Very High (25%) Risk |
|---|---|---|---|---|---|---|
| Results for 45-Year-Old Men | | | | | | |
| Aspirin vs. no treatment | $7,008 | More effective, less costly | More effective, less costly | More effective, less costly | More effective, less costly | More effective, less costly |
| Aspirin+PPI vs. aspirin alone | $819,707 | $638,688 | $499,240 | $439,567 | $367,374 | $331,556 |
| Results for 65-Year-Old Men | | | | | | |
| Aspirin vs. no treatment | — | $14,977 | $4,394 | $125 | More effective, less costly | More effective, less costly |
| Aspirin+PPI vs. aspirin alone | — | $383,144 | $334,644 | $283,8254 | $238,092 | $177,7443 |

CHD = coronary heart disease; PPI = proton pump inhibitor.

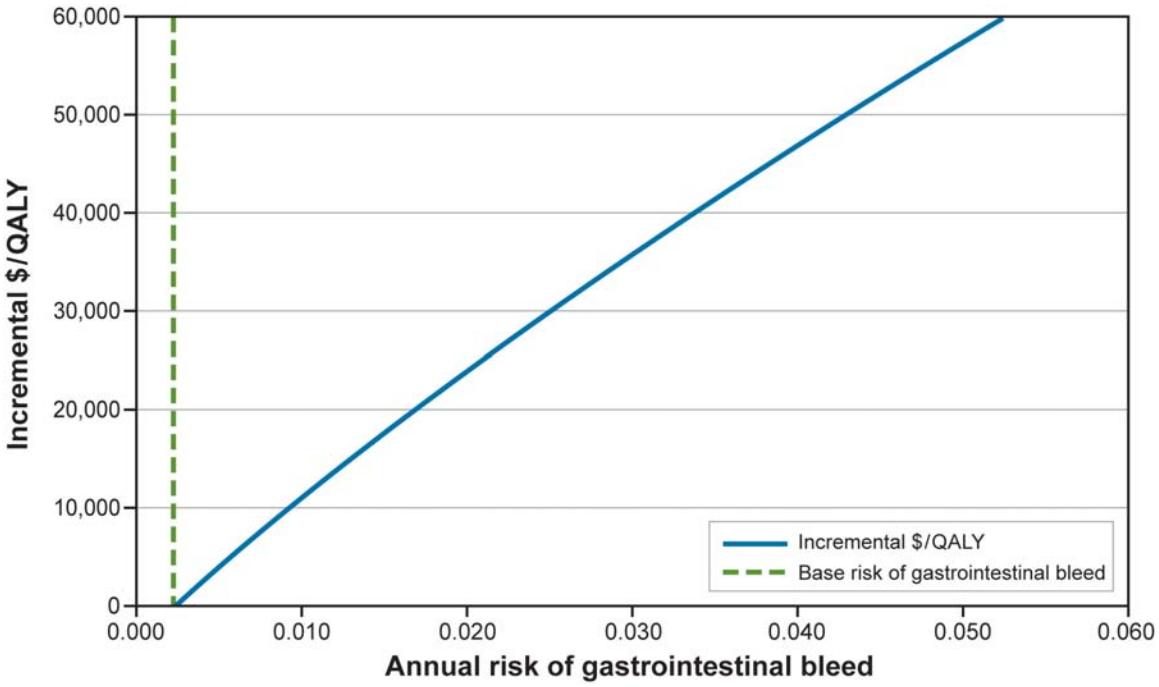
**eFigure 1. Model Structure**[a]



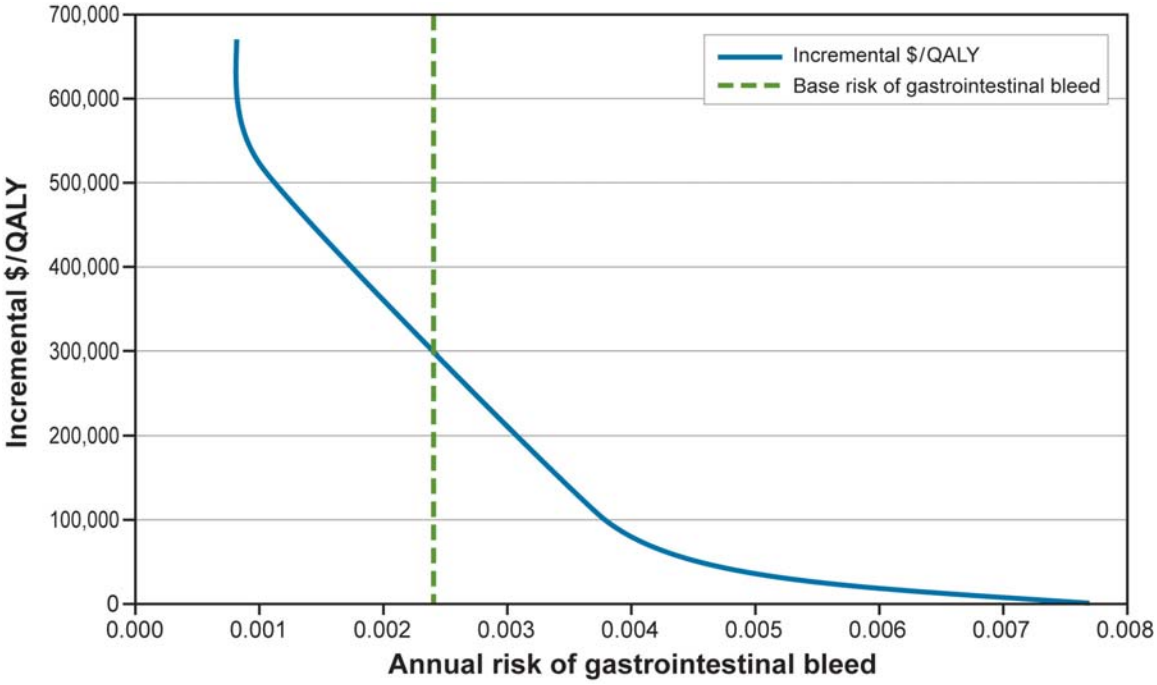

[a] Men can progress from any health state to death.

**eFigure 2. Sensitivity Analysis: Effect of Change in Baseline Gastrointestinal Bleed Risk for a 55-Year-Old Man With a 10-Year, 10% CHD Risk**

**eFigure 2A. Aspirin Versus No Treatment**



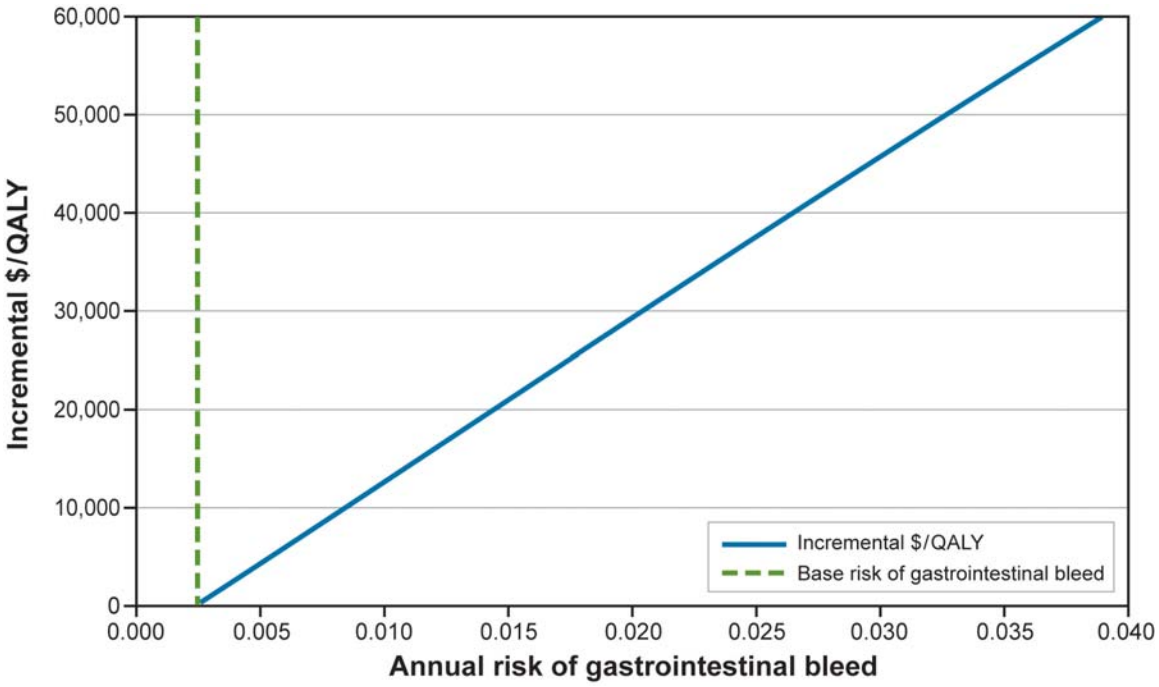
## eFigure 2B. Aspirin+PPI Versus Aspirin Alone



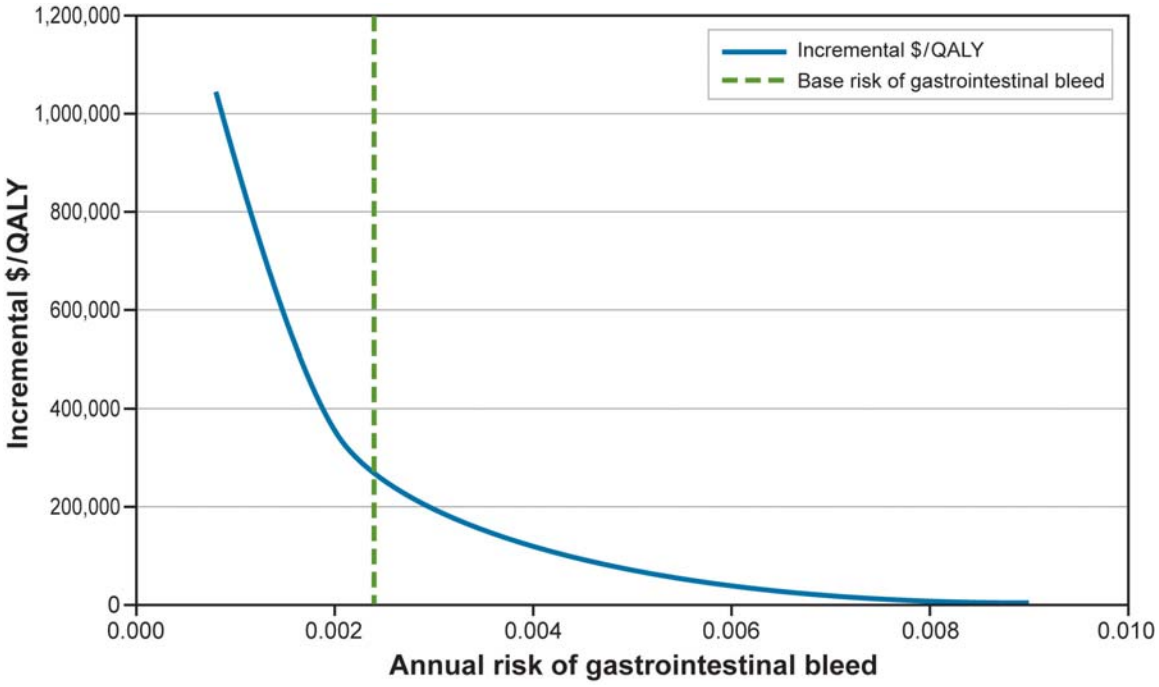

CHD = coronary heart disease; PPI = proton pump inhibitor; QALY = quality-adjusted life-year.

**eFigure 3. Sensitivity Analysis: Effect of Change in Baseline Gastrointestinal Bleed Risk for a 65-Year-Old Man With a 10-Year, 10% CHD Risk**

**eFigure 3A. Aspirin Versus No Treatment**

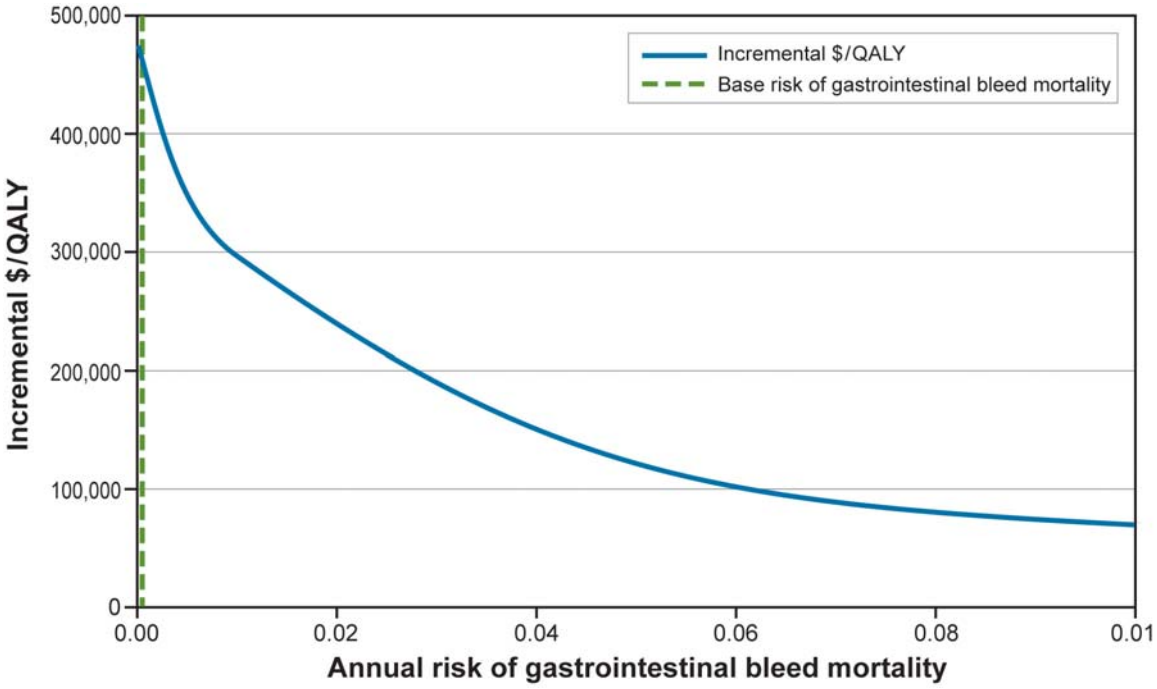


**eFigure 3B. Aspirin+PPI Versus Aspirin Alone**



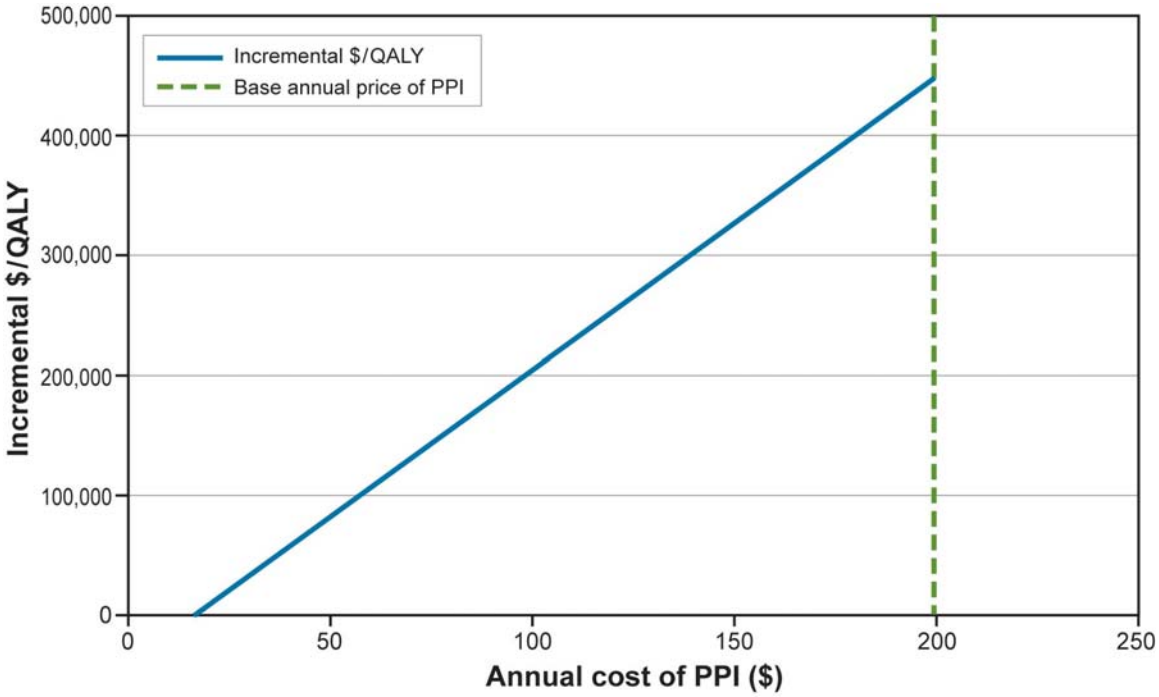

CHD = coronary heart disease; PPI = proton pump inhibitor; QALY = quality-adjusted life-year.

**eFigure 4. Sensitivity Analysis: Effect of Change in Risk of Gastrointestinal Bleed Mortality for a 45-Year-Old Man With a 10-Year, 10% CHD Risk—Aspirin+PPI Versus Aspirin Alone**



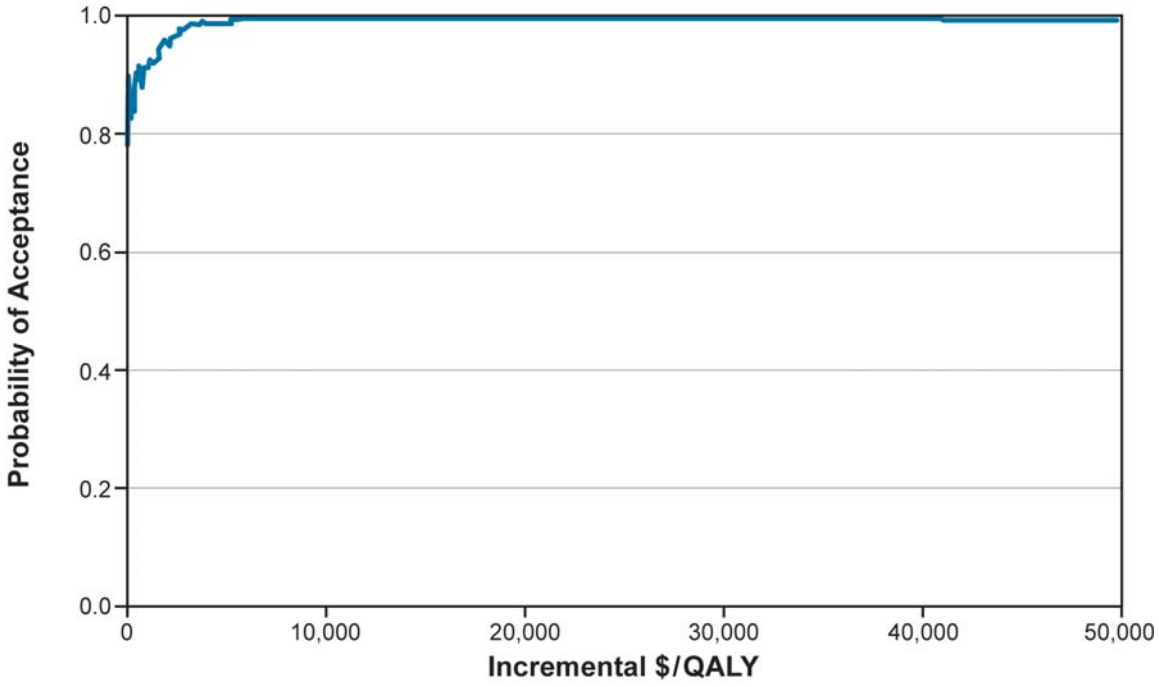

CHD = coronary heart disease; PPI = proton pump inhibitor; QALY = quality-adjusted life-year.

**eFigure 5. Sensitivity Analysis: Effect of Change in Annual Price of PPI for a 45-Year-Old Man With a 10-Year, 10% CHD Risk—Aspirin+PPI Versus Aspirin Alone**




CHD = coronary heart disease; PPI = proton pump inhibitor; QALY = quality-adjusted life-year.

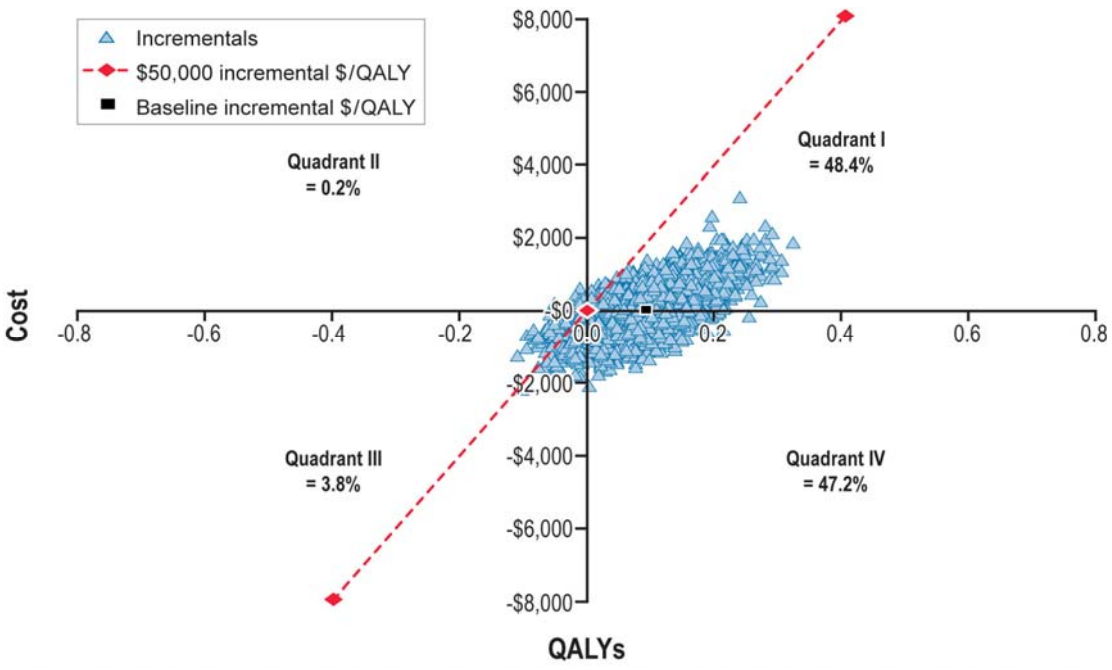
**eFigure 6. Probabilistic Sensitivity Analysis: a 45-Year-Old Man With a 10-Year, 10% CHD Risk—Aspirin Versus No Treatment Cost-effectiveness Acceptability Curve**



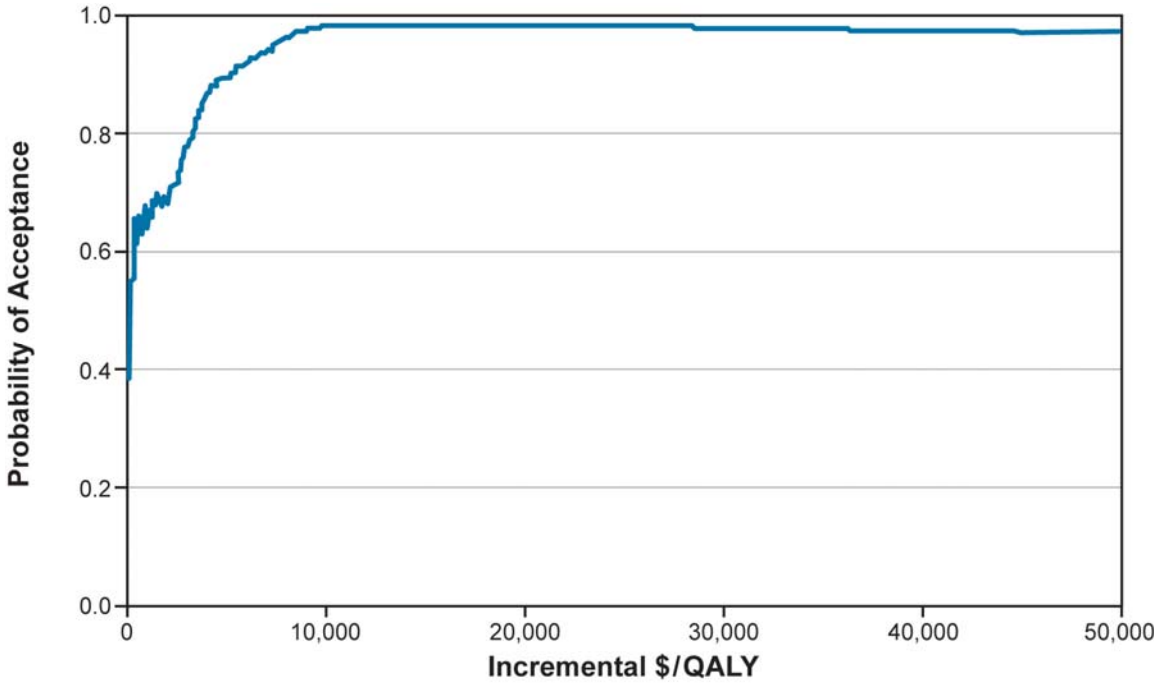

CHD = coronary heart disease; QALY = quality-adjusted life-year.

**eFigure 7. Probabilistic Sensitivity Analysis: a 65-Year-Old Man With a 10-Year, 10% CHD Risk—Aspirin Versus No Treatment**

**eFigure 7A: Scatter Plot**



**eFigure 7B. Cost-effectiveness Acceptability Curve**




CHD = coronary heart disease; QALY = quality-adjusted life-year.

**eFigure 8. Probabilistic Sensitivity Analysis: a 65-Year-Old Man With a 10-Year, 10% CHD Risk—Aspirin+PPI Versus Aspirin Alone**