

# The Potential Clinical Value of Reducing Emergency Department (ED) Involvement at Cancer Diagnosis Through Multi-Cancer Early Detection (MCED) Testing

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## INTRODUCTION

- Cancer is a leading cause of morbidity and mortality worldwide.<sup>1-5</sup> Outcomes are strongly influenced by stage and route of diagnosis.<sup>1,6</sup>
- A substantial proportion of cancers, particularly late-stage cases, are diagnosed through emergency department (ED) involvement rather than timely, non-emergency diagnostic pathways.<sup>6-8</sup>
- ED involvement is associated with worse survival, even after adjusting for socioeconomic factors, comorbidities, and stage at diagnosis.<sup>9</sup>
- Prior cost-effectiveness analyses of multi-cancer early detection (MCED) screening have focused primarily on potential benefits from reduction in late-stage diagnosis.<sup>10</sup>

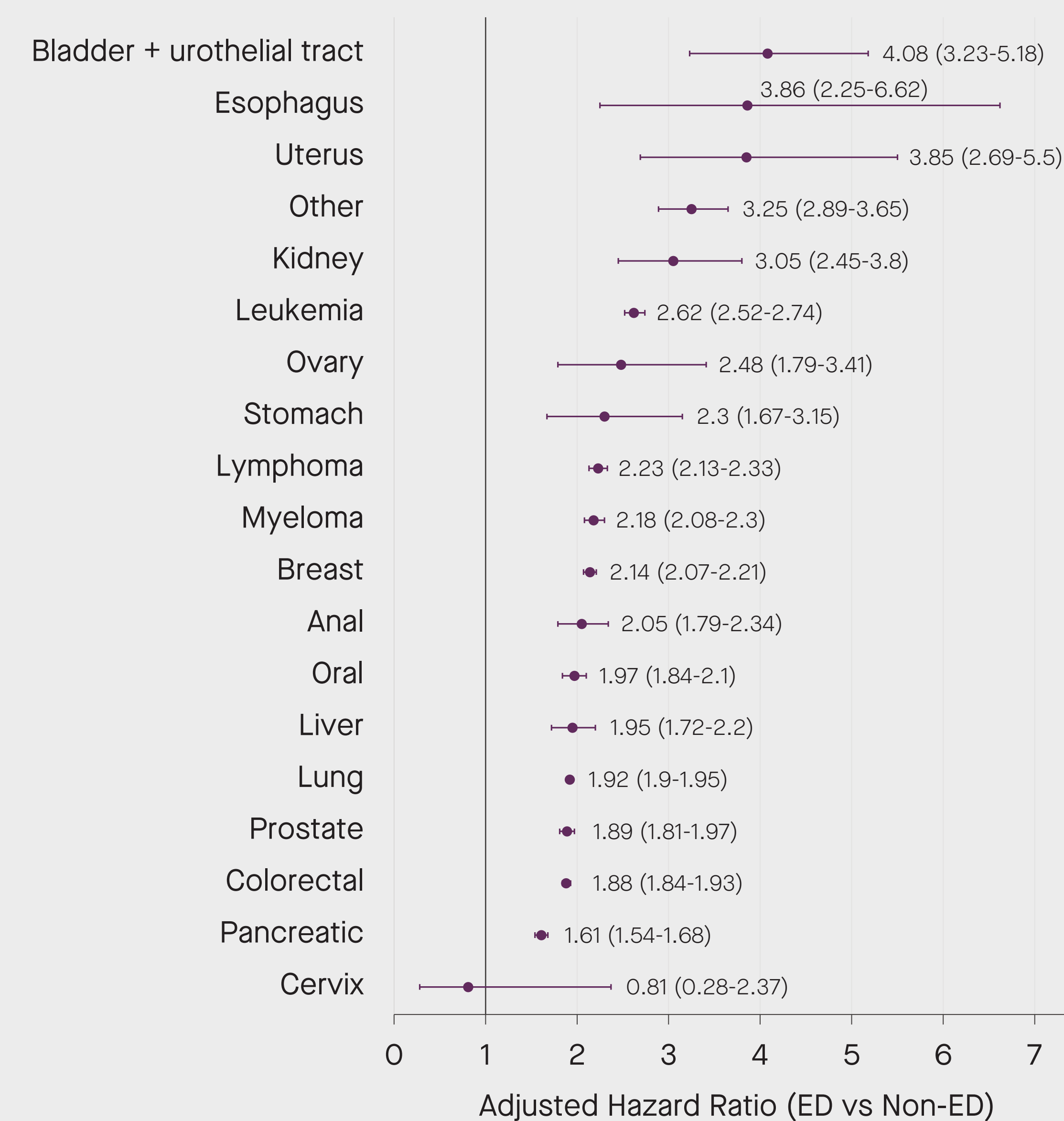
## OBJECTIVE

- This study evaluates the potential clinical impact of incorporating avoidance of ED involvement into MCED screening, including MCED-detected cancers with no modeled stage shift.

## METHODS

- A previously published cost-effectiveness model was extended to incorporate diagnostic pathways, distinguishing between ED and non-ED detected cancers.<sup>11,12</sup>
- The analysis compared annual MCED screening from age 65 to 79 plus usual care vs. usual care alone over a lifetime horizon across 19 cancers.
- The analysis assumed some ED involvement is avoidable through screening, such that MCED-detected cancers have mortality similar to other non-ED detected cancers of the same type and stage.
- Cancer- and stage-specific rates of ED involvement and associated survival hazard ratios were incorporated across all cancers using inputs informed by Surveillance, Epidemiology, and End Results (SEER)-Medicare analyses (Figure 1).<sup>9</sup>
- MCED test performance was based on published case-control data.<sup>13</sup>
- Key outcomes included reductions in ED involvement and gains in life years (LYs) and quality-adjusted life years (QALYs).

Figure 1. Mortality Hazard Ratios for ED vs. Non-ED pathways



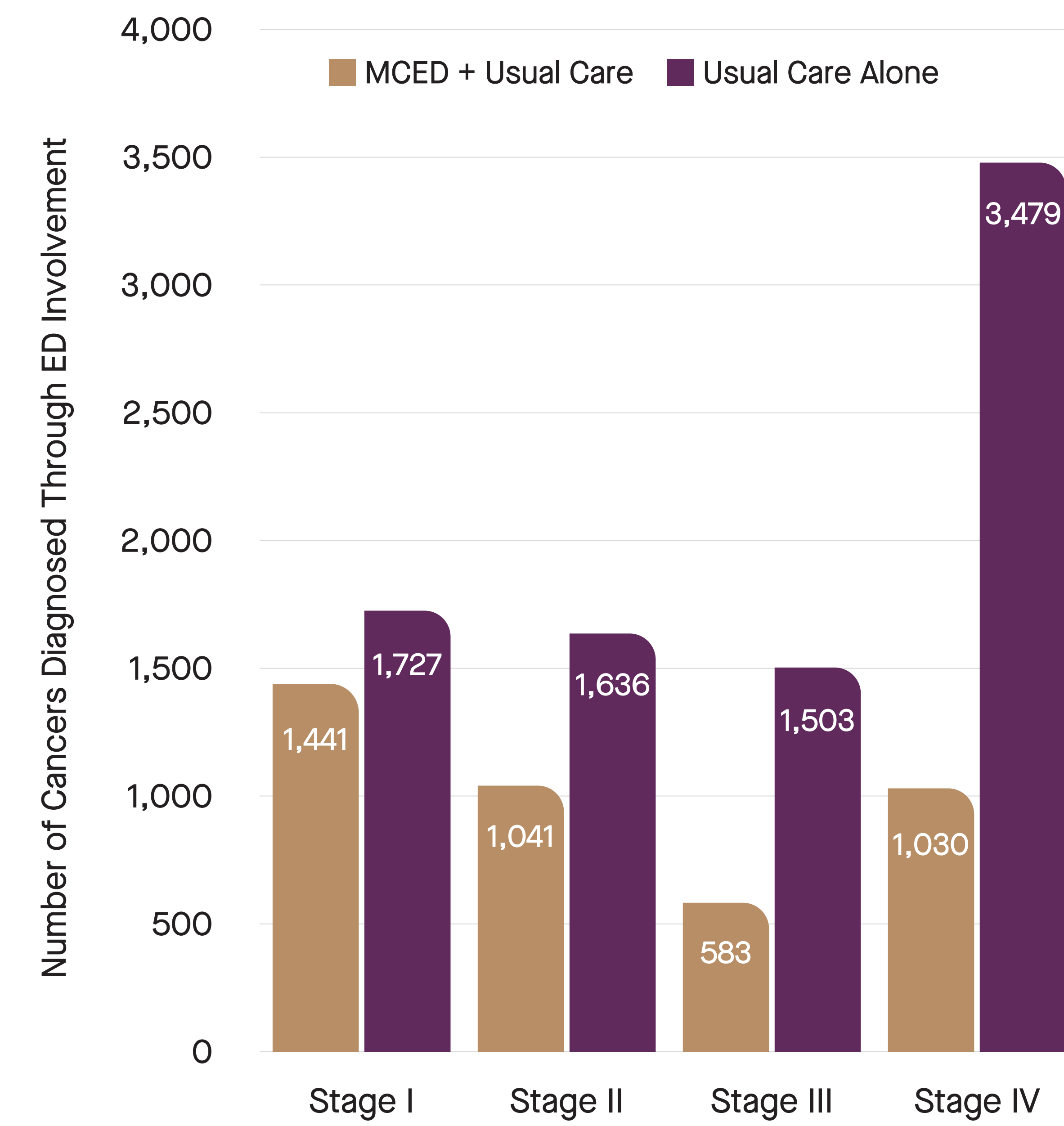
Abbreviation: ED = emergency department

## KEY RESULTS: ED AVOIDANCE MAY REPRESENT > 30% OF OVERALL QALY GAIN FROM MCED SCREENING

### RESULTS

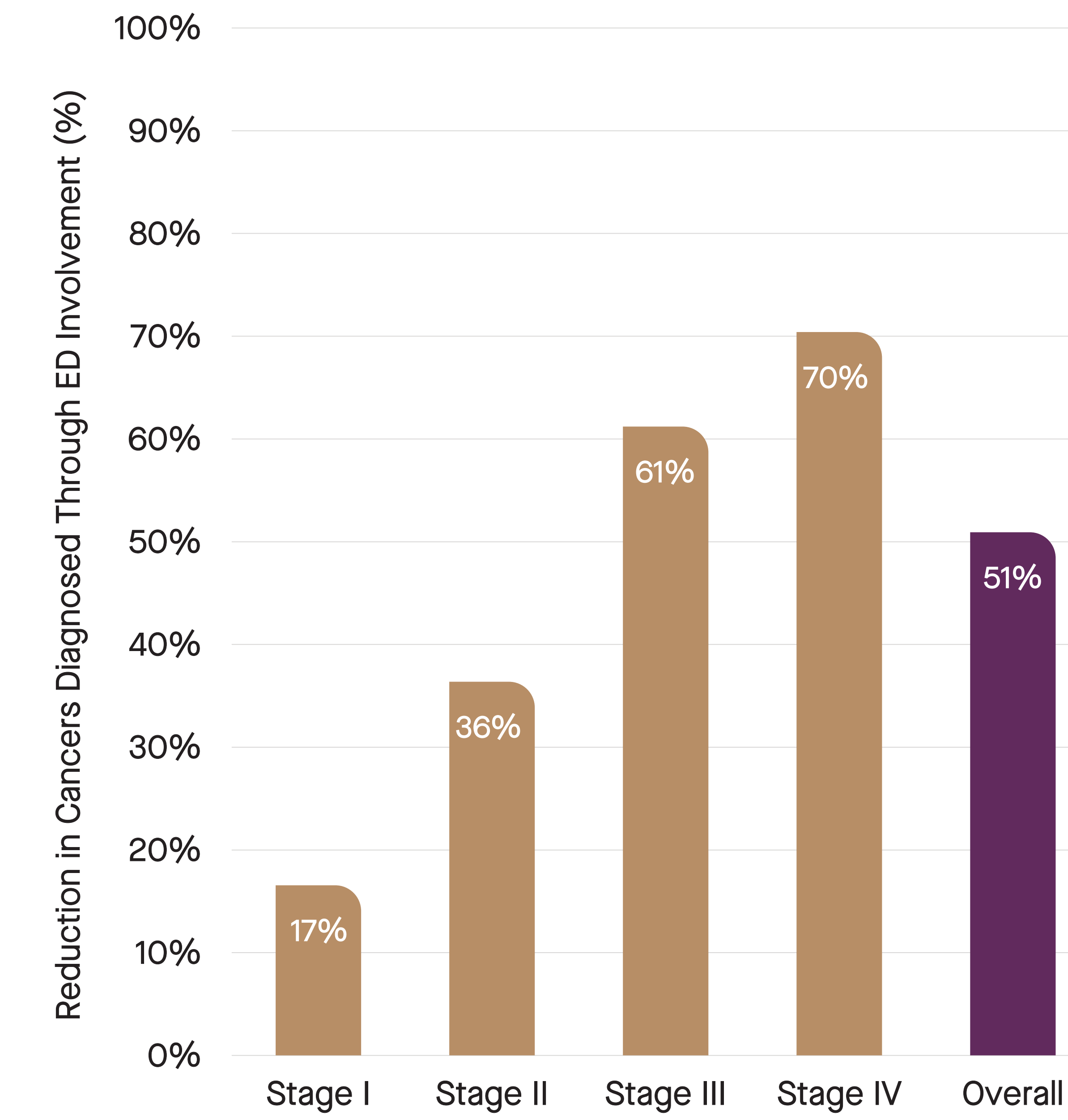
- In the usual care arm, 24.9% of cancer diagnoses occurred through ED involvement, with higher rates observed in later-stage disease (Figure 2).
- MCED screening was projected to reduce ED involvement by 51%, with the largest reductions in later-stage disease (Figure 3).
  - Stage I: 17%; stage II: 36%; stage III: 61%; stage IV: 70%
- Accounting for reduced ED involvement with MCED screening increased LYs gained per person screened from 0.12 to 0.18 and QALYs from 0.09 to 0.13.
- Avoiding ED involvement accounted for more than 30% of the total clinical gains from MCED screening, with the remaining gains driven by stage shift (Figure 4).
- Additional clinical gains from reducing ED involvement were attained in cancers shifted to earlier stages and those detected without stage shift.
- Sensitivity analyses varying MCED test sensitivity and cancer dwell time assumptions demonstrated that the relative contributions of ED avoidance and stage shift to projected LY and QALY gains were robust.

Figure 2. Number of Cancers Diagnosed Through ED Involvement by Stage and Screening Strategy (per 100,000 Cohort)



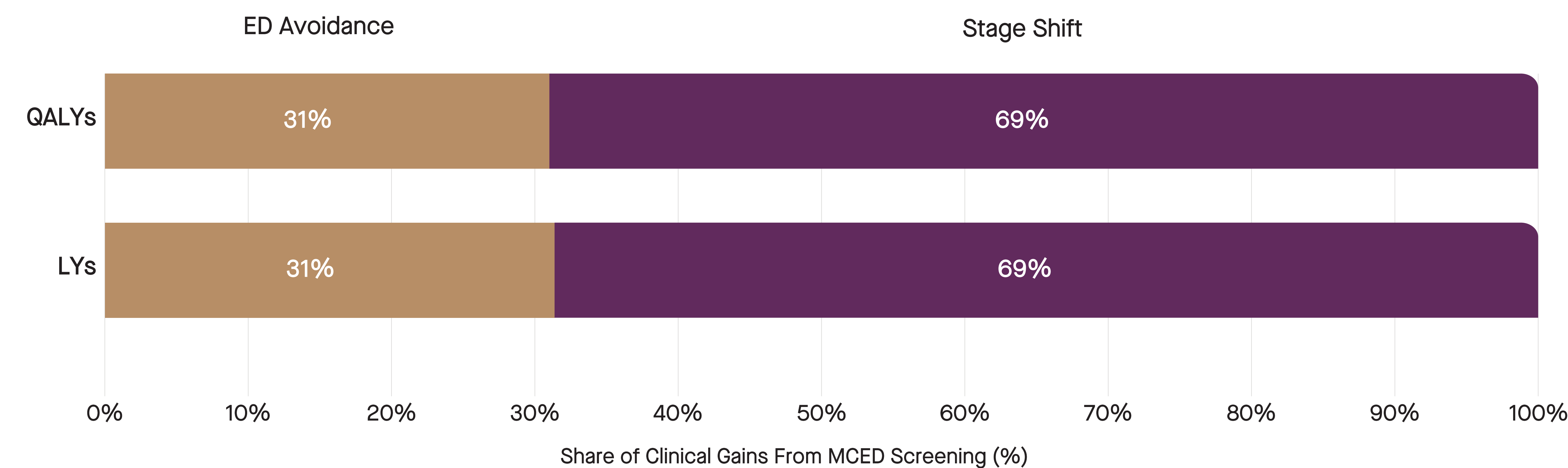
Abbreviations: ED = emergency department; MCED = multi-cancer early detection

Figure 3. Percent Reduction in Cancers Diagnosed Through ED Involvement (MCED + Usual Care vs. Usual Care Alone)



Abbreviation: ED = emergency department

Figure 4. Share of Clinical Gains From MCED Screening (Stage Shift vs ED Avoidance)



Abbreviations: ED = emergency department; LY = life year; MCED = multi-cancer early detection; QALY = quality-adjusted life year

## LIMITATIONS

- Cancers detected via MCED screening that avoid ED involvement were assumed to have mortality equivalent to non-ED detected cancers of the same type and stage.
- ED rates and associated mortality effects were derived from observational SEER-Medicare analyses and may be subject to coding limitations and residual confounding.
- This analysis does not capture downstream impacts of reduced ED involvement, including changes in healthcare utilization and costs.
- Potential additional benefits from reducing ED involvement in MCED-detectable, non-staged hematological cancers are not captured in this analysis.

## CONCLUSIONS

- MCED screening may reduce ED involvement, particularly for later-stage disease and cancers without recommended screening, leading to substantial improvements in projected clinical outcomes.
- These findings underscore the importance of incorporating reductions in ED involvement in assessments of MCED screening.

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## Disclosures

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