# Genetic Testing In Colon Cancer – How Are We Doing?

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## INTRODUCTION

- Microsatellite instability (MSI), caused by DNA mismatch repair (MMR) deficiency, is observed in up to 15% of colorectal cancers, and it has important implications in treatment and prognosis.
- Despite NCCN-guideline recommendations to broaden testing in 2014 (all patients age <70 and/or stage II), the impact of these recommendations on MSI/MMR testing in the US is unclear.

## OBJECTIVES

1. Evaluate MSI/MMR testing trends over time
2. Identify factors associated with appropriate MSI/MMR testing
3. Assess hospital-level variation in MSI/MMR testing

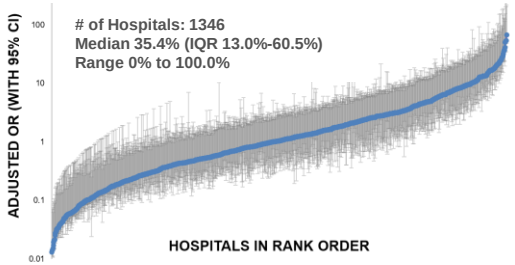
## METHODS

- Patients diagnosed with invasive colon adenocarcinoma between 2010 and 2017 who were less than 70 years old or had stage II disease were identified in the National Cancer Database.
- The primary outcome was receipt of MSI/MMR testing.
- Trends were evaluated by comparing pre-guideline (2010-2014) and post-guideline (2015-2017) periods.
- Patient, tumor, treatment, and hospital factors associated with MSI/MMR testing were assessed by hierarchical multivariable logistic regression.

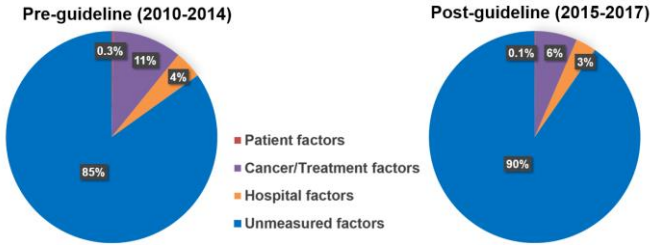
## RESULTS

- A total of 280,099 patients at 1,348 hospitals were included. Overall, 30.3% received MSI/MMR testing.
- There was a significant increase in testing after guideline recommendations (pre: 25.2% vs post: 38.2%; OR 2.15, 95% CI 2.11-2.20).
- Patients were more likely to receive testing post-guideline release if younger (<50 vs 50-69 years: OR 1.27, 95% CI 1.21-1.34), later year of diagnosis (2017 vs 2015: OR 1.72, 95% CI 1.66-1.78), treated at an academic facility (OR 1.26, 95% CI 1.09-1.44), underwent surgery (OR 4.17, 95% CI 3.88-4.48), or received chemotherapy (OR 1.20, 95% CI 1.15-1.26).

**Figure 1: Adjusted Hospital-Level Odds of MSI Testing (Post-Guideline)**




- Among hospitals, the rates of MSI/MMR testing ranged from 0-100% (median 35.4%; IQR 13.0-60.5%).
- Pre-guideline, 11% of the variation between hospitals in MSI/MMR testing was explained by cancer/treatment factors (eg, stage, receipt of surgery, chemotherapy), which decreased to 6% post-guideline.




- Patient factors (eg, demographics) accounted for less than 1% of the hospital-level variation in both the pre- and post-guideline periods.
- The remaining amount of variation in MSI/MMR testing was due to unmeasured factors (eg, physician practice patterns).

**Figure 2: Attributable Factors to Hospital Variation in MSI Testing**

## CONCLUSION

- Rates of MSI/MMR testing has increased over time but adherence to guideline recommendations remains low.
- Predictors of low MSI/MMR testing included patient, tumor, and treatment factors.
- Significant hospital variation exists in MSI/MMR testing guideline adherence, which appears to be driven by non-patient related factors.
- MSI/MMR testing is an ideal target for national quality improvement efforts to improve colorectal cancer care.

## LIMTATIONS

- This study is retrospective in nature, and therefore only association can be ascertained.
- Guidelines for MSI/MMR testing has rapidly changed in the past decade.
- Further work will need to be done to characterize the unmeasured factors leading to hospital-level variation.

## CONTACT INFORMATION

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