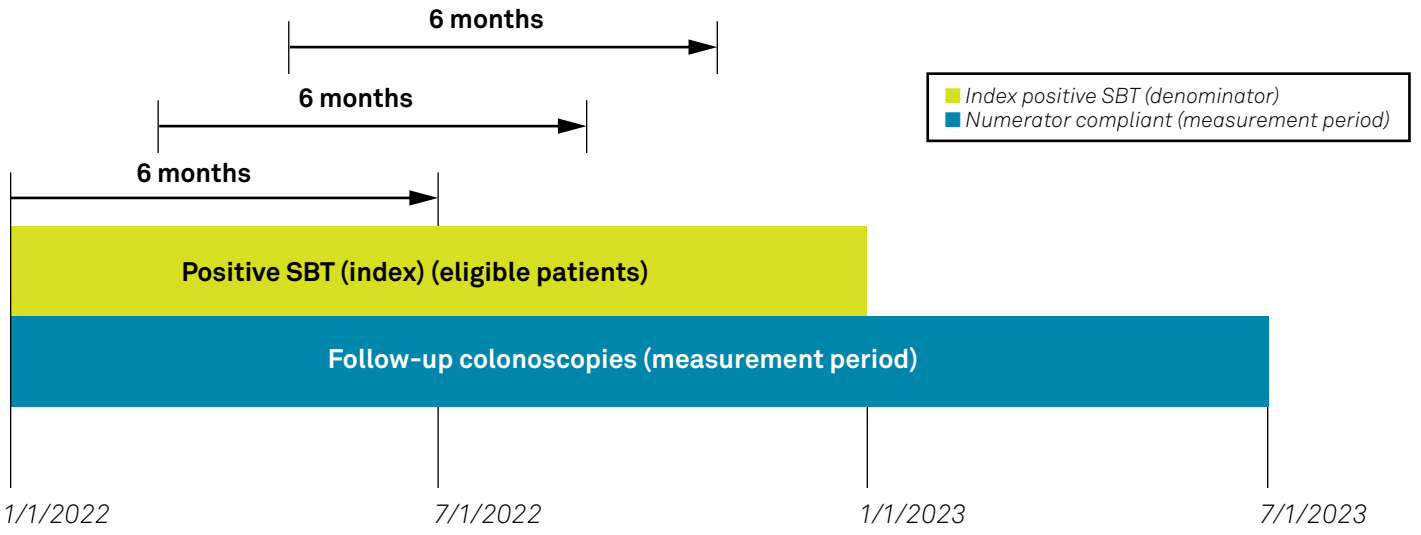
Figure 1
Measure Schema



Close the Screen

Testing a new measure to track colorectal cancer screening completion

By Elizabeth L. Ciemins, PhD, MPH, MA, Carlos A. Moreno, MHS, Jeff Mohl, PhD

Colorectal cancer (CRC) is the third leading cause of cancer death in the U.S., and estimates suggest there will be approximately 53,000 deaths attributed to the disease in 2023.[1] When found early, CRC is one of the most treatable forms of cancer, with a five-year survival rate of 90%.[2,3] In contrast, the survival rate among those diagnosed with late-stage disease is dire, at 14%.[3]

Data Source: This study used de-identified administrative claims and EHR data linked with adjudicated claims and socioeconomic status information available in the Optum Labs Data Warehouse (OLDW), a database of healthcare claims, clinical, demographic, and other data elements. The database contains longitudinal health information on enrollees and patients, representing a diverse mixture of ages, ethnicities, and geographical regions across the United States. The claims data in the OLDW include medical and pharmacy claims, laboratory results, and enrollment records for commercial and Medicare Advantage enrollees. The EHR-derived data include a subset of EHR data that have been normalized and standardized into a single database from approximately 50 U.S. HCOs.

Currently, only 37% of CRCs are diagnosed at the earliest stage.[4] To ensure timely diagnosis at the earliest stage, it is important that individuals with a positive stool-based test (SBT) receive timely follow-up with a colonoscopy. The timeliness is critical because patients have more negative clinical outcomes (e.g., later-stage diagnoses) when follow-up after a positive SBT is delayed by more than 6 to 12 months.[5–7] Diagnosis at an early stage will reduce downstream complications and minimize costs to the patient and the healthcare system.

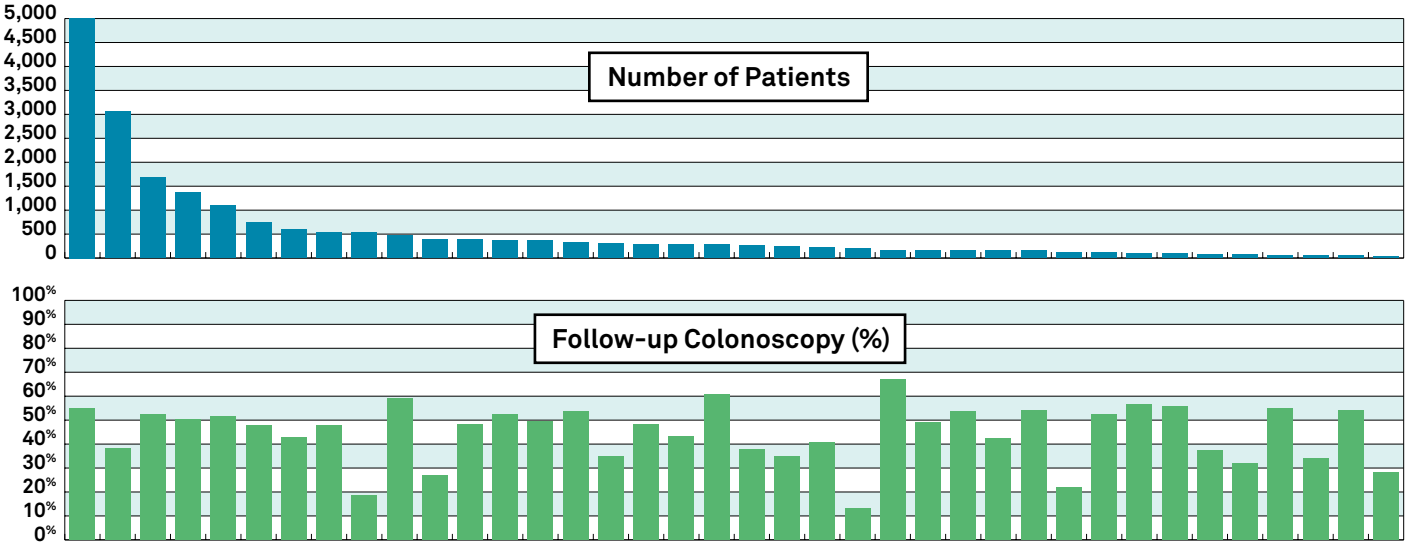
Patients and health systems are increasingly using SBTs for convenience and cost and to maximize population-level screening rates.[8] However, multiple screening programs have reported that as few as 50% of test-positive screening participants receive follow-up within six months.[9–12]

The current Healthcare Effectiveness Data and Information Set (HEDIS) measure for CRC screening[13] assesses eligible adults ages 45–75 who completed any of the following tests:

- Fecal occult blood test (FOBT) or fecal immunochemical test (FIT)—past year
- FIT + multi-target stool DNA (mt-sDNA)—past three years
- Computed tomographic colonography—past five years
- Flexible sigmoidoscopy—past five years

Figure 2

Follow-Up Screening Rates and Patient Volumes, by Healthcare Organization, 2018



Healthcare Organizations (n=38)

▶ Colonoscopy—past 10 years

The HEDIS measure is numerator compliant if an SBT is performed but it does not account for the result of the test. Only when the SBT is negative (or normal) is the screening process complete. If the SBT is positive (or potentially abnormal), a follow-up colonoscopy is required to assess for a potential cancer diagnosis. For these patients, the existing HEDIS measure only captures the first step in the screening process.

To complete the screening measure, we developed and tested a new measure to track the completion of screening for patients with positive stool-based screening results. The CRC Screening Follow-Up Measure will assess the rates of timely (within six months) follow-up colonoscopy for adults ages 45–75 who completed an initial stool-based CRC screening test (FIT or mt-sDNA) with a positive result (for the purposes of the analysis, the included age range was 50–75. The proposed measure, however, includes an expanded age range to 45, due to updated screening guidelines). (See Figure 1.)

The measure is further stratified by race and ethnicity to identify disparities in CRC screening and follow-up, which have been well-established in the literature. Black individuals have the lowest survival rates and are most likely of any racial or ethnic group to be diagnosed with late-stage CRC. Importantly, when CRC is diagnosed at a localized stage, survival rates are comparable across racial and ethnic groups.[14] We tested the robustness and reliability of the measure using an existing database of electronic health record (EHR) and adjudicated claims data (see "Data Source").

Measure Performance

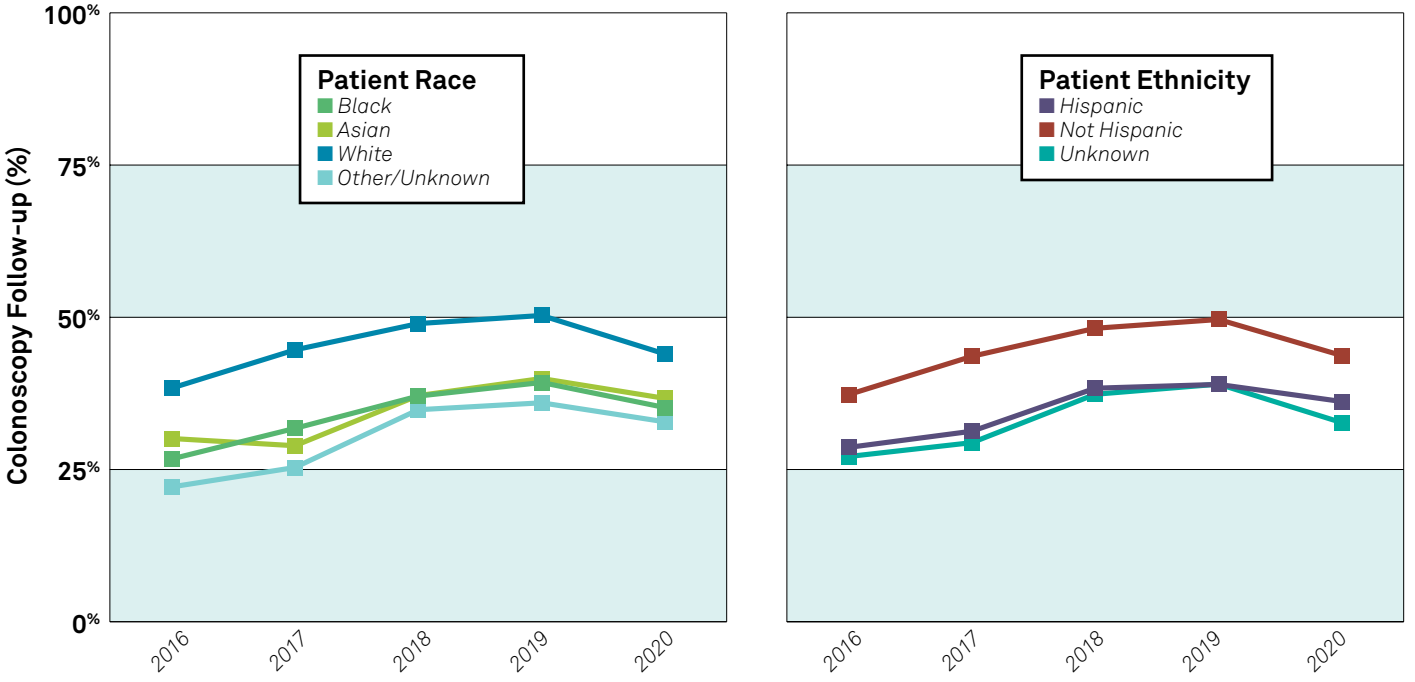
The EHR-derived population for measure evaluation included 20,581 patients with a positive SBT in the 2018 measurement year (see "Criteria"). Overall, 47.2% of patients with a positive test received a follow-up colonoscopy within 180 days, with a median follow-up time of 53 (IQR, 28-115) days. Among the subgroup of patients with overlapping claims data, we compared follow-up rates between EHR and claims-based data to determine whether a significant number of colonoscopies were simply not recorded in the EHR. For this subset of patients, the follow-up rate was

Criteria

- **Inclusion criteria:** positive CRC SBT result within measurement year (MR); age 50–75 on January 1 of MR.
- **Exclusion criteria:** previous CRC diagnosis; history of total colectomy; hospice or palliative care within 12 months of positive CRC SBT; inpatient or emergency department encounter within 14 days prior to or following a positive SBT result; SBT result associated with a CPT code indicating a diagnostic FIT within three days prior to positive test result.

Figure 3

Follow-Up Screening Rates by Race and Ethnicity, 2018–2020



51.3% using EHR data alone. The rate increased to 59.9% when we included colonoscopies captured in the claims-based data, suggesting that a moderate number of colonoscopies performed (roughly 14%) were not recorded in the EHR.

Across the 38 healthcare organizations (HCO) represented in the study sample, the median HCO size was 274 patients with a range of 39 to 5,012 patients. Follow-up rates across organizations ranged between 13% and 70%, with a median rate of 48%. Figure 2 displays the HCO size distribution (top bars) and measure performance (bottom bars) across the 38 organizations for the 2018 measurement year.

We further evaluated measure performance across all measurement years and by race, ethnicity, and age group. Colonoscopy follow-up rates increased by approximately 33% between 2016 and 2019 but declined by 14% through the 2020 measurement year ($p < 0.001$). In 2019, the most recent full year before the COVID-19 pandemic, self-reported White patients had the highest follow-up rates at 50% compared with Black and Hispanic patients at 39% ($p < 0.001$). Differences in follow-up rates between age groups ranged from 47% (ages 55–59) to 51% (ages 50–54) ($p < 0.01$).

Reliability and Feasibility

To measure the reliability of a measure is to determine how much of the variance between scores (e.g., across HCOs) is system performance (signal) versus random variation (noise). For the cross-HCO comparison, 96% of the variance in the measure was caused by between-system (HCO) differences. Comparisons across race (98%), ethnicity (97%), and measurement years (99%) all had similarly high levels of reliability. These results demonstrated good reliability as all values are above 70%, a rate considered sufficient to observe differences among HCOs or other stratifications.[15]

Feasibility testing assesses whether it is possible to collect all the required data elements for a performance measure and potentially calculate automatically the measure in an EHR system for e-measurement (eCQM). We conducted feasibility testing at three HCOs using the National Quality Forum (NQF)'s Feasibility Scorecard, which measures:

- **Availability:** the extent to which the data are readily available in a structured format across EHR systems
- **Accuracy:** the extent to which the information contained in the data is correct
- **Standards:** the extent to which the data element is coded using a nationally accepted terminology standard (vocabulary)
- **Workflow:** the extent to which capturing the data element

impacts the typical workflow for that user

Across the three systems, the majority of the data elements were determined feasible for collection. The exceptions were: (1) the ability to ascertain patients on hospice or palliative care 100% of the time, and (2) the feasibility of capturing data on inpatient stays and ER visits. For the first exception, the impact may be an underestimate of the follow-up screening rate; however, we estimate this to be negligible. For the second exception, if the hospital data feeds are not generally part of a patient's record, there is no need to capture these data, as they will not be counted in error as numerator compliant.

Conclusion

Complete screening for CRC, defined as initial screening plus follow-up of positive SBT, can lead to earlier detection and better outcomes, improving overall population health. Use of SBTs may increase overall screening rates, but positive results must be followed with a colonoscopy to diagnose CRC, ideally within six months of the positive test.

The proposed CRC Screening Follow-Up Measure is a novel, innovative measure concept that addresses an important shortcoming in an existing measure and will help ensure complete screening for CRC. We found the performance of the measure to be sufficiently low (i.e., not topped out) with sufficient variation across health systems to detect differences. The measure proved to be reliable with variation among systems caused by differences in performance and feasible collection using EHR data. Advancing this measure as a quality performance measure could significantly impact early detection of CRC, improving health—and ultimately saving lives. GPJ

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***AMGA members are participating in AMGA Foundation's Colorectal Cancer (CRC) Screening Best Practices Learning Collaborative to work to develop and implement strategies to increase CRC screening rates among all average risk patients aged 45–75 in multispecialty groups and integrated delivery systems. See* amga.org/crccollab.**

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