

Utility of a Multi-Payer Claims Database for the Estimation of Cancer Screening Rates in North Carolina

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1. Background

Current United States cancer screening estimates rely heavily on surveys, which are costly, limited in sample size, and rarely available at geographic units below the state level. The lack of local data creates a major gap that hampers identifying disparities and planning targeted interventions. Multi-payer health insurance claims databases could help fill this gap by providing timely, granular, and low-cost population-level screening information.

2. Goals

We describe the development of a multi-payer dataset linking 12 million individuals residing in North Carolina observed between 2003-2020, enabling longitudinal tracking and small-area estimation of screening across the catchment area and evaluate its utility in assessing the prevalence of being up to date (UTD) with colorectal cancer (CRC) screening at small geographic area resolutions.

3. Solutions and Methods

The data were obtained from the University of North Carolina's Cancer Information and Population Health Resource, which includes public and private health insurance claims linked to the North Carolina Central Cancer Registry (NCCCR).

We systematically aggregated and de-duplicated uniquely identified individuals across four data sources spanning overlapping years from Medicare (fee-for-service and Advantage), Medicaid, and private insurers operating within North Carolina. Individuals were uniquely identified through social security numbers, dates of birth, and sex across payers. We further processed the data sources to include monthly enrollment information between 2003 and 2020, thus allowing us to follow individuals as they transition from one insurance provider to another. In addition, we processed their payer provided location of residence (i.e., county and Zone Improvement Plan [zip] codes) over time to strengthen the dataset's ability to link to external contextual datasets, as well as identify areas of geographic interest pertaining to these beneficiaries. We linked data from the NCCCR to identify and remove individuals from the eligible screening population once diagnosed with CRC.

We assessed the prevalence of being UTD with CRC screening following the 2016 United States Preventive Services Task Force (USPSTF) guidelines as an illustrative example of the data. This included at-risk individuals who were between the ages of 50-74 and had 10 years of insurance enrollment to assess screening via:

- Colonoscopies
- Flexible sigmoidoscopy
- Computed tomographic colonography (CTC)
- Fecal immunochemical test-deoxyribonucleic acid
- Fecal occult blood test/fecal immunochemical test (FOBT/FIT) testing

Eligible cohort members were required to have county and zip code information in order for us to identify where they resided to aid in identifying small areas (the intersection of county and zip code tabulation area) in the state where there might be under-screened at-risk populations.

4. Outcomes

We identified 12,096,789 unique individuals who were insured for at least one month between 2003 and 2020. The median duration of enrollment was 64 months (interquartile range: 22, 132) and 24.6 percent of the individuals linked across \geq two payers at some point between 2003 and 2020.

We applied to the USPSTF CRC screening guidelines which required a 10-year, continuously enrolled look back period, allowing us to build annual cohorts evaluating data from each year 2012-2020. The size of the screening eligible population across the nine annual cohorts ranged from 252,007 to 330,454. Across cohorts, females comprised 54.7-56.4 percent, the median ages ranged from 62-64 years, the range of insurance coverage in the 10th year of follow-up range from 5.9-8.4 percent covered by Medicaid only, 34.6-41.4 percent for Medicare only, 22.9-24.8 percent for dual Medicare/Medicaid eligible individuals, and 28.3-35.5 percent private insurance only. Out of a total of 1,200 small areas in North Carolina, we were able to assess UTD in 1,177 small areas.

In terms of the prevalence of being UTD with CRC screening at the state level, we found that over the nine cohort years, the percentage of individuals UTD ranged from 79.8-81.2 percent. In terms of CRC screening modalities: the range of eligible individuals who had received a colonoscopy in the past 10 years ranged from 78.4-79.6 percent, received an FOBT/FIT test within the past year ranged from 5.48-9.26 percent; undergone flexible sigmoidoscopy within the past five years ranged from 1.33-1.85 percent; the receipt of CTC within the past five years ranged from 0.10-0.50 percent.

At the small area level, we were able to identify clusters with a low prevalence of being UTD across the state of North Carolina in the southern and western regions of the state, whereas higher prevalences were observed around central and eastern regions of the state.

5. Lessons Learned and Future Directions

Our multi-payer data provides a unique platform for monitoring cancer screening adherence across various geographic areas within North Carolina. This work will create tools reproducible in other states and may help a broad range of communities use their local cancer screening resources effectively and equitably.