The American Journal of Surgery xxx (2018) 1–7

Contents lists available at ScienceDirect

The American Journal of Surgery

journal homepage: www.americanjournalofsurgery.com

Insurance coverage mandates: Impact of physician utilization in moderating colorectal cancer screening rates

Michael A. Preston [a, *], Glen P. Mays [b], Zoran Bursac [c], Billy R. Thomas [d], Jonathan Laryea [a], J. Mick Tilford [e], Michelle Odlum [f], Sharla A. Smith [g], Ronda S. Henry-Tillman [a]

[a] University of Arkansas for Medical Sciences, Department of Surgery, Health Initiatives and Disparities Research, 4301 West Markham Street #827, Little Rock, AR 72205-7199, USA
[b] University of Kentucky, Department of Health Management & Policy, College of Public Health, 111 Washington Avenue #201, Lexington, KY 40536-003, USA
[c] University of TN Health Science Center, Center for Population Sciences, Department of Preventive Medicine, 66 N Pauline St., Suite 307, Memphis, TN 38163, USA
[d] University of Arkansas for Medical Sciences, Department of Pediatrics Neonatology, College of Medicine, 4301 West Markham Street, Little Rock, AR 72205-7199, USA
[e] University of Arkansas for Medical Sciences, Department of Health Policy & Management, College of Public Health, 4301 West Markham Street, Little Rock, AR 72205-7199, USA
[f] Columbia University, School of Nursing, 617 West 168th Street, Rm 225, New York, NY 10032, USA
[g] University of Kansas School of Medicine-Wichita, Department of Preventive Medicine & Public Health, 1010 N. Kansas Street, Wichita, KS 67214, USA

ARTICLE INFO

Article history:
Received 7 August 2017
Accepted 27 February 2018

Keywords:
Health services research
Health care reform
Health care delivery
Preventive health services
Precision public health

ABSTRACT

Precision public health requires research that supports innovative systems and health delivery approaches, programs, and policies that are part of this vision. This study estimated the effects of health insurance mandate (HiM) variations and the effects of physician utilization on moderating colorectal cancer (CRC) screening rates. A time-series analysis using a difference-in-difference-in-differences (DDD) approach was conducted on CRC screenings (1997–2014) using a multivariate logistic framework. Key variables of interest were HiM, CRC screening status, and physician utilization. The adjusted average marginal effects from the DDD model indicate that physician utilization increased the probability of being "up-to-date" vs. non-compliance by 9.9% points ($p = 0.007$), suggesting that an estimated 8.85 million additional age-eligible persons would receive a CRC screening with HiM and routine physician visits. Routine physician visits and mandates that lower out-of-pocket expenses constitute an effective approach to increasing CRC screenings for persons ready to take advantage of such policies.

1. Introduction

1.1. Colorectal cancer

Colorectal Cancer (CRC) is viewed as a major public health problem in the United States that is preventable and treatable.[1,2] Colorectal cancer is the third most common cancer diagnosed in men and women, and, according to the American Cancer Society, an estimated 95,270 new cases of colon cancer and 39,220 cases of rectal cancer are expected in 2016.[3] CRC has been estimated to cause over 49,190 deaths in 2016.[3–7] Although the national death rate from CRC has declined over the past 20 years, screening gaps remain higher among medically underserved populations.[1,4,6] Racial disparities have widened during this time and racial differences have been associated with prevention practice patterns among health care providers among minority populations.[1] Physician visits are critical to study since these visits can moderate preventive service utilization for CRC when out-of-pocket expenses are reduced. The current study examined health insurance coverage mandate variations and estimated the effects of physician utilization on moderating CRC screening rates when out-of-pocket

* Corresponding author. University of Arkansas for Medical Sciences, College of Medicine/Department of Surgery, Health Initiatives and Disparities Research, 4301 West Markham Street #827, Little Rock, AR 72205-7199, USA.
E-mail addresses: mapreston@uams.edu (M.A. Preston), glen.mays@uky.edu (G.P. Mays), zbursac@uthsc.edu (Z. Bursac), BillyRThomas@uams.edu (B.R. Thomas), JALaryea@uams.edu (J. Laryea), TilfordMickJ@uams.edu (J.M. Tilford), mlo12@cumc.columbia.edu (M. Odlum), ssmith37@kumc.edu (S.A. Smith), HenryRondaS@uams.edu (R.S. Henry-Tillman).

https://doi.org/10.1016/j.amjsurg.2018.02.026
0002-9610/

expenses are reduced under these mandates.

Because of these CRC screening gaps, major provisions have been offered through health insurance mandates. Patient cost sharing is associated with a reduction in preventive health service utilization and may influence screening preferences. In an effort to increase the use of preventive services, such as CRC screenings, many state policymakers passed legislation to expand coverage for CRC screenings. Most recently, in 2010, President Barack Obama signed into law the *Patient Protection and Affordable Care Act* (ACA),[8] which primarily aimed to decrease the number of uninsured Americans and to reduce overall health care costs. ACA mechanisms include mandates, subsidies, and tax credits to employers and individuals in order to increase the coverage rate for all citizens.[8,9]

1.2. New contributions

In light of the new administration and the promise to roll-back the ACA, it is important to examine health policies that may be affected in 2017. The ACA is a critical factor in increasing CRC screening rates by increasing coverage rates for all Americans. With the signing of the ACA, first dollar coverage for CRC screenings was provided for all persons of at least 50 years of age.[8,10,11] These provisions were a significant part of the health care overhaul that required or mandated that new health insurance plans or insurance policies, on or after September 23, 2010, cover preventive services without requiring patients to pay a copayment or co-insurance or to meet a deductible. These provisions apply to CRC screenings, which fall under category "A" coverage under the ACA. The U.S. Preventive Services Task Force (USPSTF) has provided grades to preventive services and offered suggestions for practices.[10,12] Category "A" coverage means that these preventive services are recommended and that there is high certainty that the service's net benefit is substantial enough to be covered by the insurer.[12]

Health insurance mandates (HiM) under the ACA reduced cost sharing for members with coverage.[9,13] Pre-ACA, the amount of cost sharing varied based on state mandates and the consumer's eligibility for Medicare or Medicaid.[14,15] Twenty-eight states covered the full range of CRC tests, and 6 states covered some of the CRC tests; the remaining states did not provide coverage (except via Medicaid) for CRC tests prior to ACA. Pre-existing health insurance plans (before the ACA was implemented) are exempt from providing coverage for CRC screening tests mandated by the ACA.

The purpose of our analysis was to provide additional insight into the introduction of the ACA and to determine the effects of physician utilization in moderating screening rates and HiM that require no cost sharing on overall CRC screening rates. Under the ACA, increased access to preventive health services via reduced out-of-pocket expenses should increase overall CRC screening rates. HiM that reduce out-of-pocket expenses represent an effective approach to increasing CRC screenings. Such policies have historically been used to improve health outcomes, and, as public health strategies, they are currently being used to increase preventive health services and, in turn, to improve the nation's health.

2. Materials and methods

2.1. Design overview

A quasi-experimental research design was conducted using time-series statistical methods—a difference-in-difference-in-differences (DDD) model—to examine variations in state mandates from 1997 to 2014 and to estimate the effect of physician utilization in moderating screening rates and HiM on preventive health services without cost sharing on CRC screening rates.[16]

Mandate states were identified as reform states at the time of the mandate, regardless of the implementation of ACA. Because states were not randomly assigned, we exploited the variation in pre-existing state mandates from 1997 to 2014 in our analysis. This approach allowed us to identify state-level effects on CRC screening. We compared the difference in pre-mandate and post-mandate states before and after the HiM. Our analysis showed that the findings are robust for various model specifications.

2.2. Study population and dataset

The study population was a sample of U.S. adults, aged 50 to 74, from the Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is an ongoing, state-based, random digit-dialed telephone survey of non-institutionalized U.S. civilians, 18 years and older, that collects information on health risk behaviors, preventive health practices, and health care access in the U.S., the District of Columbia (DC), Guam, Puerto Rico, and the U.S. Virgin Islands.[17] The BRFSS was used to assess state-level estimates of health behaviors and health care use by building a state-year longitudinal dataset from 1997 to 2014. These data provided information on types of CRC screenings, the date of the latest test performed, insurance status, race/ethnicity and socioeconomic status (SES) for the years studied. Our final analytical sample included a total of 32,569 BRFSS respondents, with 25,098 in mandate states and 7471 in non-mandate states.

The BRFSS dataset was merged with the National Cancer Institute State Cancer Legislative Database (SCLD) by state ID (FIPS Code). The SCLD allowed us to examine the extent to which states have passed laws addressing cancer disparities and to determine the types of legislation that states have enacted to address CRC.

The difference-in-differences approach has been used most often in health policy analyses to predict what outcomes occur in the absence of a particular policy. The approach allows for causal inference in examining observational data. The underlying assumption is that the post-policy trend for the treatment group will resemble that of the control group if not for the policy. These models are unique in that they allow us to observe if CRC screening rates increase because of the mandates or if unmeasured factors exist that impact screening outcomes in the population studied.

2.3. Measures

2.3.1. Outcome variable

The dependent variable of interest is CRC screening. Screening is recommended, starting at age 50 for average-risk individuals, with one of the following strategies: an annual fecal occult blood test (FOBT), a sigmoidoscopy (SIG) every 5 years, an annual FOBT plus a SIG within the past 3 years, a double-contrast barium enema (DCBE) every 5–10 years, or a colonoscopy (COL) every 10 years.

The dependent variable was coded as a dichotomous dummy variable (1,0) for people who have been screened for CRC through a FOBT or a SIG/COL test. These variables were coded for individuals who had a CRC screening test within the recommended period.

2.3.2. Control measures

The explanatory variables used are demographic characteristics, the existence of a personal physician, a doctor visit, self-reported health status, actual health status, insurance status, SES, the date of the most recent CRC screening test, and policy mandates. Dummy variables for each year were included to provide a fixed effect for each year, thereby removing secular trends among mandate states that may affect the population studied.[18]

Please cite this article in press as: Preston MA, et al., Insurance coverage mandates: Impact of physician utilization in moderating colorectal cancer screening rates, The American Journal of Surgery (2018), https://doi.org/10.1016/j.amjsurg.2018.02.026