interval of uncertainty between signal identification and resolution is minimized. Efforts to enhance drug safety surveillance and analysis are under way.[9]

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Published Online: November 14, 2011. doi:10.1001/archinternmed.2011.546
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Financial Disclosure: None reported.

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RESEARCH LETTERS

HEALTH CARE REFORM

Impact of Electronic Health Records on Racial and Ethnic Disparities in Blood Pressure Control at US Primary Care Visits

Prior literature suggests that practice level characteristics mediate racial/ethnic disparities in clinical outcomes.[1] One such practice level characteristic, use of electronic health records (EHRs) with clinical decision support (CDS), has been associated with improved blood pressure (BP) control in a national study.[2] However, we do not know whether these effects differ across racial/ethnic groups.[3] We sought to determine whether physician use of EHRs with and without CDS is associated with a reduction in racial/ethnic disparities in BP control in a nationally representative sample.

Methods. We examined data from primary care visits in the 2007-2008 National Ambulatory Medical Care Survey (NAMCS), a nationally representative survey of non-hospital-based ambulatory visits administered by the National Center for Health Statistics (NCHS).[4] In a recent article, we examined visits to NAMCS physicians who answered questions about EHRs and electronic guideline-based reminders.[2] Primary care visits for patients older than 20 years with a recorded systolic and diastolic BP were included, regardless of whether hypertension was indicated as a diagnosis code, reason for visit, or chronic condition. We used the race/ethnicity categories and imputed values provided by the NCHS.[4] In the prior analysis, we controlled for race/ethnicity but did not examine whether the effect of EHR and/or CDS on BP control differed across racial/ethnic groups.[2]

We report herein disparities in BP control as weighted percentages of visits with BP lower than 140/90 mm Hg. We stratified visits according to patient race/ethnicity and physician use of EHRs and/or CDS. We compared BP control rates for minority patients and white patients whose physicians were using similar technology. We fit a logistic regression within each strata, controlling for patient age, sex, diabetes, insurance type, and practice ownership. We conducted a secondary analysis for the one-third of patients with a known diagnosis of hypertension. Statistical analyses were performed using SAS-callable SUDAAN software (SAS version 9.2 [SAS Institute Inc] and SUDAAN version 10.0 [RTI International]).

Results. We based our analyses on 17 016 visits, representing (weighted) 682 million visits nationally. Patients had a mean age of 51 years, 33% were male, 15% had diabetes, 34% had hypertension, 64% were non-Hispanic white, 14% were non-Hispanic black, and 15% were Hispanic. Overall, 71% of non-Hispanic black patients had BP control compared with 76% for both Hispanic and non-Hispanic white patients ($P < .001$) after controlling for patient characteristics and practice ownership. Adjusted analyses limited to the known hypertensive subgroup showed similar differences in rates of BP control between non-Hispanic black (53% of visits) and non-Hispanic white patients (60% of visits) ($P = .004$).

Fifteen percent of visits were made to physicians using only EHRs, 27% to physicians using both EHRs and CDS, and 48% to physicians using neither. In fully adjusted analyses stratified by EHR and CDS use, we found improved BP control for all racial/ethnic groups among patients receiving care from health care providers using both EHRs and CDS (**Figure**). Significant differences in rates of BP control between non-Hispanic black and non-Hispanic white patients persisted in only 1 category, the visits where physicians used neither EHRs nor CDS (69% vs 75%; $P < .001$). However, among patients receiving care from physicians using both EHRs and CDS, Hispanic patients were significantly more likely to have BP control (85%) compared with non-Hispanic whites (78%) ($P = .001$). In an analysis limited to patients with hypertension, these patterns persisted; however, the Hispanic vs non-Hispanic white difference was not statistically significant.

Comment. To our knowledge, this is the first nationally representative examination of how the effect of EHRs and/or CDS on BP control differs across racial/ethnic groups. We found that previously documented patterns of racial/

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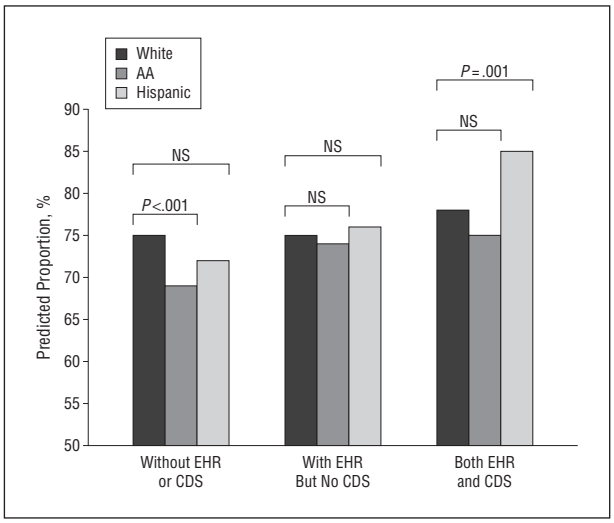

Figure. Predicted proportion with blood pressure lower than 140/90 mm Hg. Predicted proportion after adjusting for patient age, sex, diabetes, insurance, and practice ownership, and accounting for interactions between race and other covariates. AA indicates African American; CDS, clinical decision support; EHR, electronic health record; and NS, nonsignificant.

ethnic disparities are present among patients whose physicians are not using EHRs or CDS. However, there is no disparity between white and black patients whose physicians use EHRs with CDS. Furthermore, we found that Hispanic patients had the greatest change in BP control rates when their physicians use EHRs with CDS.

Our findings are subject to type II error because we are interpreting the lack of a statistical difference between groups as evidence that there is no disparity in BP control at a population level. However, our analysis is based on thousands of sampled visits in each EHR use category. Second, our analysis was limited by an approximately 30% rate of imputed race/ethnicity data, but NCHS uses validated methods to address missing data.[5] Third, though we controlled for practice ownership on the basis of association with both the exposure and outcome, unmeasured confounding by physician or practice characteristics is possible. Last, owing to the cross-sectional study design, we cannot ascertain whether EHRs with CDS decrease disparities or through which mechanism they have an effect (eg, intervening on physician barriers to guideline adherence).[5] Prospective trials must be conducted to answer these important questions. Nonetheless, our findings suggest that primary care implementation of EHRs with CDS may mitigate BP control disparities between whites and blacks, which may in turn reduce racial/ethnic disparities in morbidity and mortality from cardiovascular disease.

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Financial Disclosure: Dr Hicks is a Board Member of Health Resources in Action and a scientific advisory board member to the Health Management Corporation.
Additional Contributions: Jeffrey A. Linder, MD, MPH, provided advice on NAMCS and Shimon Shaykevich, MS, assisted in data management.

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Primary Health Care Providers' Attitudes and Counseling Behaviors Related to Dietary Sodium Reduction

High sodium intake is associated with increased blood pressure.[1] Average sodium intake among US adults far exceeds recommendations.[2] Primary care physicians and nurse practitioners are the first line of medical care and can influence opinions and behaviors of their patients.[3,4] Although some information exists about perceived advice from health professionals related to sodium reduction,[5] little is known about health care providers' own perceptions about sodium intake and patient counseling behaviors about reducing sodium intake. We used data from DocStyles, a Web-based survey of health care providers. Participants included health care providers who practiced in the United States; worked in an individual, group, or hospital setting; and had practiced medicine for a minimum of 3 years. In 2010, family/general practitioners (FGPs), internists, and nurse practitioners were asked questions on sodium. Response rates were 45.2% for FGPs and internists combined and 52.6% for nurse practitioners.

The sodium intake component of this survey consisted of 6 questions assessing health care providers' opinions and perceived counseling behaviors related to reducing dietary sodium intake. The survey also included questions about health care provider characteristics, including sociodemographic (age, sex, and race/ethnicity), medical practice (type of practitioner, practice setting, years of practice, whether they practice at a teaching hospital, and the financial situation of the majority of their patients), and health-related behavior (self-

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