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## UCLA Previously Published Works

### Title

Eliminating disparities in diabetes care: The impact of disease management strategies within triad.

### Permalink

<https://escholarship.org/uc/item/0cq2p9d7>

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### Publication Date

2005

Peer reviewed

### Access to Care Measures among Stroke Survivors by Age (all p-values < 0.003)

Access to Care Measure	Younger Stroke Survivors	Older Stroke Survivors
	Sample n (weighted %)	Sample n (weighted %)
No health insurance	133 (11)	13 (0.4)
Inability to afford medications	194 (15)	152 (6)
No general doctor visit	167 (14)	262 (10)
No general doctor or specialist visit	101 (8)	135 (5)

### DOES REALM LITERACY SCREENING TEST PREDICT MEDICATION COMPREHENSION. M.L. Plews-Ogan<sup>1</sup>; J.H. Groninger<sup>1</sup>; J.M. Schectman<sup>1</sup>; M. Donald<sup>1</sup>. <sup>1</sup>University of Virginia, Charlottesville, VA. (Tracking ID #134003)

**BACKGROUND:** Among potential risk factors for medication misunderstanding and medication errors is low health literacy. Low literacy has been linked to increased risk for hospitalization, poor diabetes control and worse outcomes for HIV care. Few studies have evaluated whether low health literacy puts patients at risk for poor understanding of and incorrect use of medications. With the known threat to patient safety posed by the use of medications, identifying risk factors for poor comprehension and incorrect use of medications is crucial. The Rapid Estimate of Adult Literacy in Medicine (REALM) has been validated as a brief, simple test to predict health literacy. We conducted a pilot study to evaluate the predictive value of the REALM score for medication knowledge.

**METHODS:** Patients at an academic internal medicine clinic who had brought their medications to their visit who agreed to participate were surveyed regarding level of education, self-reported literacy level, and number of medications. They were then administered the REALM test as well as a survey of medication comprehension (name of medication, dose, indication and known side effects) for each of their medications. The answers on the medication comprehension survey were compiled into a medication comprehension "score" (MCS)

**RESULTS:** A total of 72 patients were surveyed with a mean age of 61 (range 27-90) mean years of schooling completed 9.7 (range 1-18). For self-reported literacy level, 88% reported being able to read and understand their medication. Participants were able to provide the name for only 194 (50.1%) of medications taken, a known side-effect for only 49 (11.7%). The patients identified a correct indication for 81% of their medications and correct dosage taken for 92%. REALM score ( $R=0.27$   $p<0.001$ ) were strong predictors of MCS and patients over age 65 scored lower on MCS than patients under 65 (2.11 vs 2.59  $p=0.02$ ). Race, gender and number of medications taken were not predictive of MCS. On multivariate analysis, REALM score ( $p=0.0003$ ) and last grade completed ( $p=0.039$ ) but not age, remained independently predictive of MCS.

**CONCLUSIONS:** This survey pilot study suggests that REALM score and last grade completed may independently predict medication comprehension as assessed by the Medication Comprehension Score. Therefore, the REALM may be an accurate screening tool for patients at risk for poor medication comprehension. This tool could enable physicians to identify patients at risk and intervene with brown bag reviews and specific communication techniques that have been demonstrated to improve comprehension and outcomes.

### DRIVING DISTANCE AND DIABETES CONTROL. K.R. Strauss<sup>1</sup>; B. Littenberg<sup>1</sup>; A.R. Troy<sup>1</sup>. <sup>1</sup>University of Vermont, Burlington, VT. (Tracking ID #134770)

**BACKGROUND:** Diabetes mellitus is one of the most common chronic diseases in America, affecting approximately 10% of the adult population. Despite advances in the treatment and control of diabetes, many barriers to good diabetic control remain. One potential barrier is the driving distance from a patient's home to his or her site of care. Our goal in this study was to identify and describe the role that driving distance to site of care plays in glycemic control.

**METHODS:** We studied randomly selected adults enrolled in the Vermont Diabetes Information System (VDIS). All subjects had the diagnosis of diabetes confirmed by their Primary Care Provider (PCP) and participated in an in-home interview. Data collected included social and economic variables, home address, and duration of diabetes. Glycemic control was measured by recording a recent A1C test. Using a geographic information system (ArcView 3.3), the addresses of these subjects and their PCPs were geocoded (matched) to a commercially available geographic data set. A networking script was then used to determine the driving distance from each subject's home to the PCP's office. Subjects were broken into groups according to the driving distance: near (<5km from his or her PCP;  $n=274$ ) or far (5 km or more;  $n=401$ ). We used linear regression to estimate the effect of driving distance on glycemic control.

**RESULTS:** Subjects who live within 5 km of their PCP had slightly better glycemic control (7.0 vs. 7.2;  $P=0.19$  by t-test). Age was an important modifier of this relationship. In seniors (age 65 and older), after adjusting for sex, marital status, duration of diabetes, education, income, and health insurance coverage, the effect of distance was large and statistically significant (regression coefficient = -0.32; 95% CI -0.58, -0.05;  $P=0.02$ ). In younger subjects (under age 65), the association between distance and glycemic control was weaker (coefficient = +0.28; 95% CI -0.06, +0.62;  $P=0.11$ ).

**CONCLUSIONS:** Longer driving distances are associated with poor glycemic control in diabetic seniors in this largely rural population. This may be due to decreased mobility or sight, poor access to automobiles, or a number of other

factors. Because many younger diabetics are employed and may travel from work to their PCP, our estimates in subjects under age 65 must be viewed with caution. While further investigation is needed, especially in a more urban setting, PCPs should be aware that driving distance represents a potential barrier to good diabetic control.

### EFFECT OF RACE, ETHNICITY AND SOCIOECONOMIC STATUS ON BONE DENSITY TESTING AFTER HIP FRACTURE. J.M. Neuner<sup>1</sup>; X. Zhang<sup>1</sup>; R. Sparapani<sup>1</sup>; P.W. Laud<sup>1</sup>; A.B. Nattinger<sup>1</sup>. <sup>1</sup>Medical College of Wisconsin, Milwaukee, WI. (Tracking ID #135906)

**BACKGROUND:** Osteoporotic fractures are known to be less common in members of some racial and ethnic groups than in white Americans, but the effects of this upon osteoporosis identification and care are not well-described. We hypothesized that even after hip fracture, nonwhite race and lower socioeconomic status are associated with lower rates of investigation of bone density in female Medicare recipients.

**METHODS:** A cohort of women Medicare enrollees aged 67-91 from three states (FL, NY, IL) who had a hip fracture in 2001 was identified by adapting a published fracture algorithm (previously reported positive predictive value 98%) using 100% of each state's Medicare claims. As bone density tests are Medicare-reimbursed every 2 years, appropriate osteoporosis testing was defined as any bone density test (ultrasound or X-ray absorptiometry) performed between 2 years before and 6 months after the fracture. Race and ethnicity were measured as designated by Medicare. Income was assigned based on the mean per capita income in the subject's zip code, and then categorized by terciles. Logistic regression was used to examine the association of bone density testing with race, ethnicity and zip-code level measures of socioeconomic status during the 30-month period with adjustment for age, comorbidity, urban/rural residence and state.

**RESULTS:** The overall rate of bone density testing among 17,934 hip fracture patients was 23%. In unadjusted analyses, the rate of testing in white women was 23%, in Hispanic women 10% and in black women 10%. In a logistic regression model adjusted for age and comorbidity, black women (adjusted odds ratio 0.38 [95% Confidence Interval 0.28, 0.50]) and Hispanic women (AOR 0.45 [95%CI 0.32, 0.62]) were less likely than white women to receive bone density tests. Compared with women residing in zip codes in the highest tercile of income, those in the lowest tercile were 23% less likely (AOR 0.78 [95%CI 0.71, 0.85]) and those in the middle tercile 11% less likely to receive testing (AOR 0.89 [95%CI 0.82, 0.97]). Compared with New York residents, Florida residents were more likely (AOR 1.50 [95%CI 1.38, 1.62]) to be tested, while Illinois residents were less likely (AOR 0.86 [95%CI 0.78, 0.94]). Urban residence and educational attainment did not affect testing and were removed from the model.

**CONCLUSIONS:** In a large population-based cohort, women of black race and Hispanic ethnicity, as well as those residing in lower-income zip codes, were much less likely to receive bone density testing. As all women were insured and at high recurrent fracture risk, barriers to osteoporosis recognition such as physician overapplication of population statistics to individual patients deserve further study.

### ELIMINATING DISPARITIES IN DIABETES CARE: THE IMPACT OF DISEASE MANAGEMENT STRATEGIES WITHIN TRIAD. O. Duru<sup>1</sup>; C.M. Mangione<sup>1</sup>; A.J. Karter<sup>2</sup>; D.S. Kountz<sup>3</sup>; M.M. Safford<sup>4</sup>; C. Tseng<sup>5</sup>; B. Waitzfelder<sup>6</sup>; R. Gerzoff<sup>7</sup>; S. Huh<sup>1</sup>; W. Steers<sup>1</sup>; A. Brown<sup>1</sup>. <sup>1</sup>University of California, Los Angeles, Los Angeles, CA; <sup>2</sup>Kaiser Permanente Division of Research, Oakland, CA; <sup>3</sup>University of Medicine and Dentistry of New Jersey, New Brunswick, NJ; <sup>4</sup>University of Alabama at Birmingham, Mountain Brook, AL; <sup>5</sup>Pacific Health Research Institute, Honolulu, HI; <sup>6</sup>Centers for Disease Control and Prevention (CDC), Atlanta, GA. (Tracking ID #135935)

**BACKGROUND:** Minorities with diabetes generally receive lower quality care than whites after controlling for insurance status, and have higher rates of some, but not all, complications. Disease management programs to improve quality of care for all patients may indirectly reduce racial/ethnic disparities in diabetes care.

**METHODS:** Data come from 6,251 patients from 10 managed care plans and 68 provider groups included in the Translating Research into Action for Diabetes (TRIAD) study, a multicenter longitudinal cohort study of diabetes care in managed care. Race/ethnicity (white, African American, Latino, Asian/Pacific Islander) was the primary predictor variable. We examined three sets of dependent variables: processes of care from self-report and chart review, intermediate outcomes (hemoglobin A1c, blood pressure, and low-density lipoprotein/LDL cholesterol), and whether patients with poorly controlled intermediate outcomes were managed with aggressive medication regimens. Models were stratified by intensity of use of four provider group-level disease management strategies: use of a diabetes registry, physician reminders, performance feedback, and care management. Multilevel models were then used to generate predicted probabilities for each ethnic group at the 20th percentile (low-intensity) and 80th percentile (high-intensity) of each disease management strategy.

**RESULTS:** In low-intensity groups, disparities in LDL screening, A1c screening, and flu vaccine use were observed for African Americans relative to whites (ranging from 4% to 10%). Only the disparity in flu vaccine use remained in the high-intensity groups. Regardless of disease management intensity level, Latinos and Asians/Pacific Islanders had equal or superior predicted processes of care compared to whites. All minority groups had poorer predicted control of intermediate outcomes than whites within both low and high-intensity groups. African Americans had lower predicted values of aggressive therapy for elevated hemoglobin A1c values than whites in groups with low intensity of care management (disparity of 8%) and use of a diabetes registry (disparity of 7%). These

differences were not observed within groups intensively implementing these two disease management strategies. In contrast, among persons with poor control, Latinos and Asians/Pacific Islanders received the same level of aggressive therapy as did whites.

**CONCLUSIONS:** In a setting of uniform access to care, process delivery and aggressive management of poor risk factor control was comparable between Latinos and whites and Asians/Pacific Islanders and whites. However, in low-intensity groups disparities remained for African Americans compared to whites, with some attenuation in the high-intensity groups. All minority groups had worse intermediate outcomes than whites, suggesting that disease management programs as presently implemented are not eliminating disparities in risk factors. Research identifying mutable factors closely related to intermediate outcomes in diabetes might provide strategies to address the issue of disparities in diabetes complications.

**EXAMINING THE LINK BETWEEN COMMUNICATION AND MEDICATION ADHERENCE AMONG AFRICAN AMERICANS AND LATINOS.** A. Ang<sup>1</sup>; A. Brown<sup>1</sup>; D. Morisky<sup>1</sup>.  
<sup>1</sup>University of California, Los Angeles, Westwood, CA. (Tracking ID #135871)

**BACKGROUND:** Hypertension disproportionately affects minority populations in part due to many different socio-cultural factors that affect adherence to anti-hypertensive drug therapies. In multicultural minority populations, issues dealing with patient communication may play a significant role because of linguistic and contextual barriers that inhibit effective provider-patient communication. In this study, we examine the relationship between provider-patient communication and medication adherence.

**METHODS:** 1,367 African American (75%) and Hispanic American (25%) adults participated in the study at a large teaching hospital on the West Coast. Participants are representative of the surrounding, predominantly low-income minority community. The patients were randomly assigned to health providers, and received one of three types of intervention designed to enhance provider-patient communication: Individualized patient counseling sessions (CS) following clinic visits, a computerized appointment (CAPT) reminder patient tracking system, home visits by community health workers (CHW) to encourage family members to support patient's management of lifestyle and medication adherence, or the usual care (UC). Patient adherence was measured at baseline and six months after the intervention using the Morisky adherence measure, which is scaled from 1 (low) to 3 (high). We used multilevel ordered logistic models to evaluate the effects of the intervention on patient adherence, after adjusting for individual health beliefs, social support, patient satisfaction, complexity of medication regimen, BMI, age, baseline adherence and ethnicity.

**RESULTS:** After the intervention, patients who received counseling sessions (odds ratio (OR) 1.23, (95% CI 1.07-1.84),  $P=.02$ ) or home visits from community health workers (OR 1.31, (95% CI 1.12-1.95),  $P<.001$ ) were more likely to adhere to their medication treatment. There was no significant difference between those who received computerized appointment reminders (OR .99, (95% CI .86-1.25),  $P=.34$ ) and those who received the usual care. Patient adherence was also associated with health beliefs (OR 1.15, (95% CI 1.04-1.28),  $P=.03$ ), patient satisfaction (OR 1.07, (95% CI 1.03-1.11),  $P=.04$ ), and complexity of medication regimen (OR=.55, (95% CI .38-.79),  $P=.01$ ).

**CONCLUSIONS:** In this randomized intervention study, African American and Latino patients who received personalized communication from health providers or community health workers had better medication adherence after the intervention. These providers may influence the adherence behavior of their patients by supporting and reinforcing current positive behaviors or clarifying misunderstandings and incorrect beliefs.

**FACTORS MEDIATING ETHNIC DIFFERENCES IN GLYCEMIC AND CARDIOVASCULAR RISK FACTOR CONTROL IN DIABETES.** L.H. Miller<sup>1</sup>; S.R. Lipsitz<sup>2</sup>; S. Natarajan<sup>1</sup>.  
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**BACKGROUND:** Ethnic differences in cardiovascular risk factor levels and glycemic control persist in US adults with diabetes. While these disparities have been demonstrated, little is known about what patient and system characteristics are responsible for these differences. Identifying patient and system characteristics that mediate these differences may be important to developing interventions that target these characteristics in order to ameliorate these disparities.

**METHODS:** We analyzed the 1999-2000 National Health and Nutrition Examination Survey to evaluate if hemoglobin A1c % (HbA1c) and cardiovascular risk factors such as systolic blood pressure (SBP), low-density lipoprotein (LDL) and high-density lipoprotein (HDL) cholesterol, and triglycerides (TG) varied by ethnicity. Ethnic categories analyzed were non-Hispanic whites (NHW), non-Hispanic blacks (NHB) and Mexican-Americans (MA). Initially, multi-variate linear regression was used to test if HbA1c, SBP, LDL cholesterol, HDL cholesterol and TG differed by ethnicity. Further mediation analyses evaluated if education level, access to care, duration of diabetes and insulin use were responsible for the variation in cardiovascular risk factors and HbA1c among diabetics by R-square change analyses ( $\Delta R^2$ ). All analysis incorporated the complex survey design effects to determine population estimates.

**RESULTS:** Significant ethnic differences were noted in HbA1c, HDL cholesterol and triglyceride levels. NHW had significantly lower HbA1c levels (7.48% compared to NHB (8.31%) and MA (8.26%). In contrast, NHB had significantly higher HDL cholesterol (50.5 mg/dl) and lower TG (177.9 mg/dl) than NHW (HDL 42.4 mg/dl, TG 243.5 mg/dl) and MA (HDL 43.6 mg/dl, TG 311.9 mg/dl). Education level was the single largest determinant of variability in HbA1c ( $\Delta R^2$  2.80,

$p<.05$ ), with more modest effects ( $p>.05$ ) of access to care ( $\Delta R^2$  1.10), duration of diabetes ( $\Delta R^2$  1.18) and use of insulin ( $\Delta R^2$  1.62). Though the magnitude was small, duration of diabetes was significantly responsible for the variation in SBP ( $\Delta R^2$  change 0.27) and TG ( $\Delta R^2$  1.69), and access to care for variation in LDL ( $\Delta R^2$  0.05). None of these variables were significantly responsible for variability in HDL cholesterol.

**CONCLUSIONS:** Ethnic differences between HbA1c, HDL cholesterol and TG levels continue in US adults with diabetes. Education level is the predominant patient characteristic mediating differences in HbA1c. Eliminating disparities in education may decrease ethnic differences in glycemic control. Future research should evaluate other behavioral, socioeconomic and biologic factors as mediators of ethnic differences in order to effectively develop interventions to eliminate disparities.

**GENDER AND TOTAL KNEE/HIP ARTHROPLASTY UTILIZATION RATE IN THE VA SYSTEM.** S. Borrero<sup>1</sup>; K. Kwoh<sup>1</sup>; J. Sartorius<sup>2</sup>; S.A. Ibrahim<sup>2</sup>.  
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**BACKGROUND:** Studies have reported that women are less likely than men to undergo certain medical procedures including cardiac catheterization, coronary revascularization, and renal transplant. Limited data suggest that gender differences exist in the utilization rate of elective total knee/hip joint arthroplasty, a cost-effective treatment option for end-stage knee/hip osteoarthritis (OA). OA is a leading cause of disability in the elderly and is more prevalent in women. A population-based study in Canada found women to be less likely to undergo the treatment compared to men. A similar study has not yet been done in the US. Therefore, we examined gender differences in utilization rates of total knee/hip joint arthroplasty among US patients who are potentially at risk for the procedure and have equal access to the treatment.

**METHODS:** The study sample included all Veterans Administration (VA) patients (total cohort) during fiscal year 1999 who were 50 years of age or older. To narrow the sample to those at risk for the procedure, we identified a sub-sample (OA sub-cohort) consisting of patients with a diagnosis of lower extremity OA. The primary outcome of the study was receipt of total knee or hip joint arthroplasty within two years (FY 2000 and 2001). Baseline comparisons were performed using chi-square tests for categorical variables and t-tests for normally distributed continuous variables. For multivariable modeling, we used random effects logistic regression with hospital site as the random effect to account for clustering effects. The final model outcomes were adjusted for age and the number of comorbidities. Analyses on the total cohort adjusted for OA in order to take into account gender differences in OA prevalence, and race and region were eliminated from the final models after determining that these variables did not impact the outcome.

**RESULTS:** A total of 1,968,093 VA patients were identified (total cohort) of whom 329,461 patients had lower extremity OA (OA sub-cohort). In the total cohort, 1,923,524 (97.7%) were male and 44,569 (2.3%) were female, which are reflective of the national VA patient population. In the OA sub-cohort, 319,924 (97.1%) were male and 9,537 (2.9%) were female. The mean age was 65 years in the total cohort and 66 years in the OA sub-cohort. Women had a significantly higher rate of rheumatologic disease than men ( $p=0.001$ ). In the total cohort, 5,370 (0.3%) had total knee arthroplasty and 2,709 (0.1%) had total hip arthroplasty within the two-year follow-up period. In the OA sub-cohort, 4,791 (1.5%) had total knee arthroplasty and 2,220 (0.7%) had total hip arthroplasty. For the total cohort, the two-year adjusted odds of women undergoing total knee or hip arthroplasty were 1.02 (0.88 to 1.20) and 1.10 (0.89 to 1.36), respectively. For the OA sub-cohort, the two-year adjusted odds of women undergoing total knee or hip arthroplasty were 0.97 (0.83 to 1.14) and 1.00 (0.79 to 1.27), respectively.

**CONCLUSIONS:** Among patients at risk for total knee/hip joint arthroplasty, men and women who receive care in the VA system were equally likely to undergo the procedure.

**GOOD DOCTOR-PATIENT RELATIONSHIP CAN OVERCOME LANGUAGE BARRIERS.** Q. Ngo-Metzger<sup>1</sup>; D. Sorkin<sup>1</sup>; R.S. Phillips<sup>2</sup>; M. Massagli<sup>3</sup>; B. Clarridge<sup>4</sup>; S. Greenfield<sup>1</sup>; S. Kaplan<sup>1</sup>.  
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**BACKGROUND:** Previous research has shown that language concordance between doctors and patients is related to higher patient satisfaction with care. To what degree, if any, can a good-doctor patient relationship overcome barriers imposed by doctor-patient language discordance? We sought to examine the independent effects of the quality of the doctor-patient relationship and language discordance on patients' ratings of care.

**METHODS:** We surveyed 3,258 (74% response rate) Chinese and Vietnamese patients who had an office visit in the last month at one of 11 health centers across the U.S. In a mail survey in multiple languages, we asked patients to report on different aspects of their visit and to rate the quality of overall care. We studied patients whose doctors spoke their native language (concordant group) vs. those who did not (discordant group). We used patient-level multivariable logistic regressions to determine the effects of language concordance and the quality of the doctor-patient relationship on patients' ratings of the quality of care (including rating of the overall quality of the last visit, rating of doctor, and recommendation of the clinic). We adjusted for patient demographic characteristics (including age, education, primary language, English proficiency, time in