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Cardiovascular Disease and Risk in Primary Care Settings in the United States

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Abstract

Primary care site may play an important role in cardiovascular disease prevalence; however, the distribution of risk factors and outcomes across care sites is not known. We conducted a cross-sectional analysis of 21,778 adult participants from the National Health and Nutrition Examination Survey (99-08) using multivariable logistic regression to assess the relationship between site of usual care and disease prevalence. We examine patients' self-reported history of several chronic conditions (Hypertension, Diabetes, and Hypercholesterolemia), awareness of chronic conditions, and associated cardiovascular events (Angina, CHD, CVD, MI, and Stroke). After adjustment for demographic and healthcare utilization characteristics, there were no significant differences in the prevalence of diabetes or hypercholesterolemia between patients receiving usual care at private doctors' offices, hospital outpatient clinics, community-based clinics, and emergency rooms(ER). However, participants without a usual source of care and those receiving usual care at an ER have significantly lower awareness of their chronic conditions than participants at other sites. The odds of having a history of each of the adverse cardiovascular events ranged between 2.21 and 4.18 times higher for people receiving usual care at ER's relative to private doctors' offices. In conclusion, participants who report utilizing ER's as their usual site of care are disproportionately more likely to have a history of poor cardiovascular outcomes and are more likely to be unaware of having hypertension or hypercholesterolemia. As health care reform takes place and millions more begin seeking care, it is imperative to ensure access to longitudinal care sites designed for continuous disease management.

Keywords

Cardiovascular risk factor; Cardiovascular Disease; Primary Care

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Introduction

We examined a nationally representative sample of participants from the National Health and Nutrition Examination Survey (NHANES) to provide a direct comparison of self-reported sites of primary care in reference to patient composition, prevalence of conditions known to be risk factors for adverse cardiovascular outcomes, markers of adequate disease management and cardiovascular outcomes. We explore whether the prevalence of cardiovascular outcomes differ by site after adjusting for known patient level demographic, lifestyle, and access related risk factors.

Methods

We analyzed 5 waves of NHANES data, between the years of 1999-2008, to explore whether an independent relationship exists between respondents' self-reported source of usual care and the prevalence of selected chronic and cardiovascular events. We examined the prevalence of self-reported Hypertension, Diabetes Mellitus, Hypercholesterolemia, Angina, Coronary Heart Disease (CHD), Myocardial Infarction (MI), Congestive Heart Failure (CHF) and Stroke among individuals receiving primary care across four distinct sites of care, as well as people reporting having no usual site of care.

NHANES is a cross-sectional survey administered to a nationally representative sample of non-institutionalized U.S population. Data collection for patients includes a detailed questionnaire of health status, history, and behaviors, an examination of currently prescribed medications available at the time of interview, and selected lab tests on patient samples when appropriate. Our analysis was limited to adult participants ages 20 or above who identified one primary or no primary site of usual care, yielding a total of 21,778 participants.

Our dependent variables were the prevalence of selected chronic conditions and cardiovascular events. Appendix Table 1 provides the actual wording of the questions used to assess disease status. Survey participants were asked whether a health professional had informed them they had each of our studied conditions. In reference to diabetes, hypercholesterolemia and hypertension, we used a list of currently prescribed anti-diabetic medications, total cholesterol readings of > 200 mg/dl and average blood pressure readings > 140/90 respectively to identify additional cases.

The primary independent variable was participants' report of their site of usual care. Categories were a composite variable derived from two questions asked in the NHANES questionnaire. The first question asked respondents whether they had a place where they usually went for their health care. If participants indicated that they had a usual site of care, a follow up question prompted them to identify the site as one of the following: Community Health Center/Clinic (CHC), Hospital Outpatient Clinic, Emergency Room (ER), Private Doctor's Office/Health Maintenance Organization (HMO), or multiple sites. We excluded patients who indicated using multiple sites of primary care from our sample due to the small number of positive respondents (N = 187).

Participant level covariates included age (20 to 29 years, 30 to 44 years, 45 to 54 years, 55 to 65 years, or older than 65 years), race/ethnicity (White, Black, Mexican, other Hispanic, or other race), type of insurance (Medicare, Medicaid, private, uninsured, or other), gender, and income as measured by a poverty to income ratio.[1] Additional covariates were smoking status (current, former, and never) and number of physician visits in the 12 months prior to the survey

Using patient weights provided by NHANES, we evaluated the demographic distribution of participants at each primary care site. We fit a multivariable logistic regression model to estimate the age-adjusted and fully adjusted prevalence of chronic conditions across sites. Fully adjusted logistic regression models included the primary independent and dependent variables as described previously and the aforementioned covariates. Using the results from these logistic regression models, for each site of care, we calculated fully adjusted proportions (prevalence), which are adjusted to the total population distribution of these potential confounders.

We next modeled the 3-level outcome 'Global burden of cardiovascular disease', defined as the proportion of participants at each site with a self-reported history of 0, 1 and 2 or greater of the following conditions: hypertension, diabetes, hypercholesterolemia, or one of several related cardiovascular events (Stroke, MI, CHD, Angina, or CHF). To estimate the global risk of disease prevalence at each site of care, we constructed age-adjusted and fully adjusted multinomial logistic regression models for the 3-level outcome corresponding to the aggregate number (0, 1, ≥ 2) of observed conditions.

In secondary analyses, we explored patient awareness of selected chronic conditions, since poor management of these conditions may impact the likelihood of cardiovascular events. Lack of awareness was examined for hypertension and cholesterol separately; defined as the proportion of individuals with average blood pressure readings or total cholesterol measures out of normal range ($> 140/90$ for hypertension, > 200 mg/dl for cholesterol) who reported not being informed they had high blood pressure or high cholesterol by a health professional. We constructed logistic regression models adjusted for all of the previously mentioned covariates other than number of visits and compared participants receiving usual care at private doctor's offices/HMO's to other care sites. Finally, to understand how the observed relationship was mediated by number of visits we constructed additional models including this variable. Results are reported with two tailed-p values significant at the alpha $< .05$ level and confidence intervals when appropriate. All analyses were performed with SAS 9.2 and SUDAAN 10.0, both of which accounted for the weights, strata, and clusters of the complex survey design.

Results

Of the 21,778 NHANES participants from 1999-2008 (representing 198,971,878 adults nationally) 18,127 participants (83%) received their usual care at a private doctor's office or an HMO, hospital-based outpatient clinic, or CHC; 435(2%) identified their usual source as an ER and 3,216(15%) reported no usual source of primary care. Compared to private doctor's offices/HMO's, patients seeking their care at ER's, hospital outpatient clinics and CHC's were more likely to be racial/ethnic minorities, have a lower income relative to the poverty line, and to be uninsured (Table 1). Participants without a usual site of care were on average younger than patients with usual sources of care and had the highest rates of being uninsured when compared to respondents reporting a usual site of care (Table 1).

Table 2 presents adjusted prevalence rates of hypertension, diabetes mellitus and hypercholesterolemia by reported sites of care. Individuals who identified as having no site of usual care had the lowest adjusted prevalence of hypertension, diabetes and hypercholesterolemia. After adjustment, few differences in chronic disease prevalence were observed between sites; however, as compared to private doctor's offices, both participants using CHC's as their source of usual care had statistically significantly lower adjusted rates of being diagnosed with hypertension. In addition to reporting the lowest burden of disease for many of the chronic conditions, participants without a usual site of care also had a lower overall disease burden. For example, over half of these participants reported no history of

chronic or cardiovascular disease at all, with only 15% reporting being diagnosed with ≥ 2 conditions compared to a range between 23 and 27 % of patients across the other care sites (Table 3)

Our analysis shows that poor hypertension awareness was significantly more common for participants without a usual site of care and those reporting the ER as their primary site of care than for participants receiving care at private doctor's offices/HMO after adjustment patient age, gender, race, insurance type, income and smoking status (Table 4). Among participants with a blood pressure reading $>140/90$ ($N=9,440$), 61% of participants without a usual site of care reported not being informed about their high blood pressure. Lack of hypertension awareness was present in nearly half (46%) of individuals receiving care in ER's and 39% of participants receiving usual care in doctor's offices/HMO. In a final model, adjusting for the number of outpatient visits in addition to the other covariates, results only persisted for participants without a usual site of care. No significant adjusted differences between other care sites and private doctor's offices/HMO were observed (Table 4). Similar patterns were observed for patient awareness of hypercholesterolemia.

We observed stark disparities in the proportion of participants with a self-reported history of cardiovascular disease among care sites in analyses. Specifically, for each of the 5 cardiovascular conditions examined, individuals using the ER as their source of usual care reported significantly greater odds of having a history of disease than participants obtaining usual care from other sites. (Table 5) For example, approximately 11 % of participants who receive their usual care in the ER have a self-reported history of a diagnosed MI; this proportion is in contrast to between 3 and 4 % of participants at each of the other sites of care. Relative to those receiving usual care at private doctor's offices/HMO's, the odds of having a history of any of the selected cardiovascular diseases for people receiving usual care at the ER ranged between 2.21 and 4.18 times higher (all $p < 0.05$) (Table 5).

Discussion

In this large, nationally representative sample of U.S. adults from 1999-2008 we observed that community and hospital based clinics serve a larger proportion of racial/ethnic minority, low-income, and uninsured patients relative to private doctors offices. However, on average, patients at these clinics do not have a higher prevalence of specific chronic diseases or a greater global burden of common co-morbidities after adjustment for demographic, access, and clinical risk factors. We also found that individuals who reported not actively engaging in the health care system have a lower adjusted prevalence of chronic and cardiovascular conditions than those with usual sites of care. While this finding is reassuring as it suggests that most individuals with conditions signifying an elevated cardiovascular risk have access to a site of primary care, it may also indicate that persons without significant illness are less inclined to seek primary care and as a result may be at risk for future disease due to inadequate screening and preventative care.[2] Our investigation also shows that participants without a usual site of care and those using the ER for usual care have poorer awareness of hypertension and hypercholesterolemia than participants at other care sites. Last, our results show that patients receiving their usual care at ERs have considerably higher odds of having a history of stroke, CHD, CHF, MI and angina than those engaged in sites equipped to provide more continuous primary care.

To date, there has been little systematic investigation of differences between patients at distinct care sites regarding the prevalence of conditions which are cardiovascular risk factors or associated outcomes. Our results indicate most primary care sites have comparable proportions of patients with chronic diseases among their patient population before and after adjustment; an empirical contradiction to inferences made by some investigators who have

suggested that sites serving greater proportions of traditionally underserved populations also serve sicker patients. [3, 4] These results are also consistent with previous studies finding comparable quality of care across most longitudinal care sites [5, 6]. Our findings must be interpreted with caution, given that we only used the metric of chronic and cardiovascular disease prevalence and previous research suggests that CHC's and hospital based clinics serve patients with additional social complications that may impact both the severity of disease and likelihood of optimal primary care interactions with providers.[7]

The finding that individuals receiving their usual care at ERs have significantly greater odds of a history of cardiovascular complications has several important implications. First, given the chronic disease profiles across care sites the disproportionate burden of cardiovascular events in the ER could indicate that the secondary prevention provided at emergency rooms is less robust than sites designed to provide continuous care. Indeed, several investigations have demonstrated that adequate chronic disease management is an essential factor in preventing cardiovascular events [8-10]. To investigate this potential link we explored whether patient awareness of disease, a critical step in secondary prevention, differed significantly across sites of care. Our results suggest that regular interaction with providers is responsible for much of the observed difference in awareness between participants receiving care at an ER relative to other care sites; however, ongoing care from ER providers remains an unlikely prospect for most patients. Differences in patient awareness are also concerning for individuals without a usual site of care. Although this group is generally younger and healthier than other participants, they may enter the health care system with more progressed conditions and be less equipped to manage them [11, 12]. A portion of respondents affirming they receive usual care at ER's may represent a subsection of those without a usual source of care who have adopted the ER as a usual source after an adverse cardiovascular event. This situation is also problematic as previous evidence has identified an increased risk of subsequent preventable cardiovascular events among individuals with a history of cardiovascular conditions without access to continuous primary care [13-15].

Improved access to longitudinal care is especially relevant in light of the recent health care reform legislation which extends insurance coverage to several million previously uninsured Americans in the coming years. In addition to the inefficiency and unnecessary costs that would be associated with substantial proportions of these individuals using emergency rooms as their source of usual care, our results indicate that the lack of continuous primary care could be associated with poorer awareness of chronic conditions which contribute to increased cardiovascular disease risk.

There are several limitations to these analyses. First, NHANES is a cross-sectional survey; as a result, we cannot determine the temporal relation between site of primary care and the examined health outcomes. Second, our clinical outcomes and information regarding patient site of usual care were self-reported potentially leading to some misclassification of the exposure and outcomes. Third, we examined a relatively limited set of chronic/ cardiovascular conditions, reducing our ability to get a total indicator of the disease burden across care sites. Last, we also used a binary indicator of disease status and cannot dismiss the possibility that participants across care sites have variable severity in their chronic disease as an alternative explanation for the differences in the odds of cardiovascular events. Despite these limitations, we used a nationally representative validated survey and found that participants who report utilizing ER's as their usual site of care are more likely to be unaware of having hypertension or hypercholesterolemia and disproportionately more likely to have a history of poor cardiovascular outcomes.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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References

1. Health and Nutrition Examination Survey Data Documentation. Retrieved from the world wide web, accessed from <http://www.cdc.gov/nchs/nhanes/nhanes2007-2008> on March 17, 2011
2. Hafner-Eaton C. Physician utilization disparities between the uninsured and insured. Comparisons of the chronically ill, acutely ill, and well nonelderly populations. *JAMA*. 1993; 269:787–792. [PubMed: 8423663]
3. Jacobson PD, Dalton VK, Berson-Grand J, Weisman CS. Survival strategies for Michigan's health care safety net providers. *Health Serv Res*. 2005; 40:923–940. [PubMed: 15960698]
4. Schiff G, Fegan C. Community health centers and the underserved: eliminating disparities or increasing despair. *J Public Health Policy*. 2003; 24:307–311. [PubMed: 15015864]
5. Hicks LS, O'Malley AJ, Lieu TA, Keegan T, Cook NL, McNeil BJ, Landon BE, Guadagnoli E. The quality of chronic disease care in U.S. community health centers. *Health Aff (Millwood)*. 2006; 25:1712–1723. [PubMed: 17102197]
6. McGlynn EA, Asch SM, Adams J, Keesey J, Hicks J, DeCristofaro A, Kerr EA. The quality of health care delivered to adults in the United States. *N Engl J Med*. 2003; 348:2635–2345. [PubMed: 12826639]
7. Dievler A, Giovannini T. Community health centers: promise and performance. *Med Care Res Rev*. 1998; 55:405–431. [PubMed: 9844349]
8. The Long-Term Intervention With Pravastatin in Ischaemic Disease (LIPID) Study Group. Prevention of cardiovascular events and death with pravastatin in patients with coronary heart disease and a broad range of initial cholesterol levels. *N Engl J Med*. 1998; 339:1349–1357. [PubMed: 9841303]
9. UK Prospective Diabetes Study (UKPDS) Group. Effect of intensive blood-glucose control with metformin on complications in overweight patients with type 2 diabetes (UKPDS 34). *Lancet*. 1998; 352:854–865. [PubMed: 9742977]
10. Sacks FM, Pfeffer MA, Moye LA, Rouleau JL, Rutherford JD, Cole TG, Brown L, Warnica JW, Arnold JM, Wun CC, Davis BR, Braunwald E. Cholesterol and Recurrent Events Trial investigators. The effect of pravastatin on coronary events after myocardial infarction in patients with average cholesterol levels. *N Engl J Med*. 1996; 335:1001–1009. [PubMed: 8801446]
11. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr, Jones DW, Materson BJ, Oparil S, Wright JT Jr, Roccella EJ. Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. National Heart, Lung, and Blood Institute; National High Blood Pressure Education Program Coordinating Committee. Seventh report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure. *Hypertension*. 2003; 42:1206–1252. [PubMed: 14656957]
12. American Diabetic Association. Standards of medical care in diabetes—2008. *Diabetes Care*. 2008; 31:S12–54. [PubMed: 18165335]
13. Adams H, Adams R, Del Zoppo G, Goldstein LB. Stroke Council of the American Heart Association; American Stroke Association. Guidelines for the early management of patients with

ischemic stroke: 2005 guidelines update a scientific statement from the Stroke Council of the American Heart Association/American Stroke Association. *Stroke*. 2005; 36:916–923. [PubMed: 15800252]

14. Adams HP Jr, Brodt TG, Furlan AJ, Gomez CR, Grotta J, Helgason CM, Kwiatkowski T, Lyden PD, Marler JR, Torner J, Feinberg W, Mayberg M, Thies W, A statement for healthcare professionals from a Special Writing Group of the Stroke Council, American Heart Association. Guidelines for thrombolytic therapy for acute stroke: a supplement to the guidelines for the management of patients with acute ischemic stroke. *Circulation*. 1996; 94:1167–1174. [PubMed: 8790069]
15. Wolf PA, Clagett GP, Easton JD, Goldstein LB, Gorelick PB, Kelly-Hayes M, Sacco RL, Whisnant JP. Preventing ischemic stroke in patients with prior stroke and transient ischemic attack: a statement for healthcare professionals from the Stroke Council of the American Heart Association. *Stroke*. 1999; 30:1991–1994. [PubMed: 10471455]

Table 1

Weighted participant characteristics by site of care, 1999-2008.^a

Variables	Private/HMO (N = 13,364)	CHC/Clinic (N = 4,241)	Hospital Outpatient (N = 522)	Emergency Room (N = 435)	No Usual Site (N = 3,216)	P Value
Age^b						
20-29	13 %	18 %	15 %	27 %	35 %	
30-44	29 %	30 %	24 %	36 %	36 %	<.001
45-54	23 %	22 %	18 %	18 %	18 %	
55-64	15 %	13 %	19 %	8 %	7 %	
65+	21 %	17 %	24 %	10 %	4 %	
Race						
White	78 %	64 %	51 %	52 %	58 %	
Black	10 %	13 %	23 %	29 %	10 %	<.001
Mexican	4 %	12 %	7 %	6 %	17 %	
Other						
Hispanic	4 %	6 %	12 %	6 %	8 %	
Other Race	4 %	5 %	7 %	6 %	7 %	
Insurance Type						
Medicare	8 %	8 %	16 %	5 %	2 %	
Medicaid	4 %	8 %	13 %	9 %	3 %	
Private	68 %	55 %	31 %	33 %	42 %	<.001
Other	10 %	10 %	15 %	9 %	5 %	
Uninsured	9 %	20 %	24 %	44 %	49 %	
Gender						
Male	43 %	45 %	61 %	59 %	67 %	<.001
Mean PIR^c						
	2.94	2.16	1.93	1.72	2.11	<.001
Smoking Status						

Variables	Private/HMO (N = 13,364)	CHC/Clinic (N = 4,241)	Hospital Outpatient (N = 522)	Emergency Room (N = 435)	No Usual Site (N = 3,216)	P Value
Current	20 %	25 %	33 %	49 %	36 %	<.001
Former	28 %	25 %	26 %	13 %	17 %	
Never	52 %	50 %	41 %	37 %	47 %	
Avg. Number of Outpatient Visits in the 12 Months Prior to the Survey	2.94	2.33	2.51	1.67	0.92	<.001

^a CHC, HMO, and PIR are abbreviations for Community Health Center, Health Maintenance Organization and Poverty/Income Ratio .

^b Column totals may not sum to 100 percent due to rounding.

^c Income-to-poverty ratios represent the ratio of family or unrelated individual income to their appropriate poverty threshold.

Age- Adjusted and Fully Adjusted Predicted Marginal Proportions and Odds Ratios of Chronic Disease Prevalence by Site of Usual Primary Care ^{a, b}

Table 2

Condition	Private Doctors Office/HMO	CHC / Clinic	Hospital Outpatient Clinic	Emergency Room	No Usual Site of Care
Diabetes Mellitus					
Age –Adjusted Proportion	8 %	9 %	15 % *	9 %	2 % *
Fully Adjusted Proportion	8 %	8 %	10 %	7 %	3 % *
Fully Adjusted Odds Ratio (95 % CI)	Ref.	0.93 (0.78, 1.11)	1.32 (0.93, 1.88)	0.86 (0.50, 1.46)	0.27 (0.19, 0.39)
Hypertension					
Age –Adjusted Proportion	41 %	40 %	46 %	43 %	34 % *
Fully Adjusted Proportion	41 %	38 % *	42 %	41 %	37 % *
Fully Adjusted Odds Ratio (95 % CI)	Ref.	0.86 (0.75, 0.97)	1.04 (0.79, 1.37)	1.02 (0.79, 1.31)	0.81 (0.72, 0.92)
Hypercholesterolemia					
Age –Adjusted Proportion	29 %	27 % *	30 %	18 % *	17 % *
Fully Adjusted Proportion	28 %	28 %	29 %	22 %	22 % *
Fully Adjusted Odds Ratio (95 % CI)	Ref.	0.93 (0.84, 1.03)	1.02 (0.75, 1.40)	0.68 (0.46, 1.01)	0.64 (0.55, 0.75)

^a Model adjusted for age, sex, race, income, insurance type, smoking status, and number of outpatient visits in the 12 months prior to survey

^b CHC, and HMO are abbreviations for Community Health Center and Health Maintenance Organization

* P< .05 for all comparisons with private doctor's offices/HMO

Table 3Adjusted Proportion of Participants at Each Site of Care with 0, 1, ≥ 2 Conditions. ^{a, b}

Care Site	0 conditions	1 condition	≥ 2 conditions
Private Doctor's Office/HMO			
Age Adjusted Prevalence	45 %	31 %	24 %
Fully Adjusted Prevalence	46 %	30 %	24 %
CHC/ Clinic			
Age Adjusted Prevalence	46 %	30 %	24 %
Fully Adjusted Prevalence	47 %	30 %	23 %
Hospital Based Outpatient Clinic			
Age Adjusted Prevalence	42 %	28 %	30 % *
Fully Adjusted Prevalence	46 %	27 %	27 %
Hospital Emergency Room			
Age Adjusted Prevalence	46 %	27 %	26 %
Fully Adjusted Prevalence	45 %	28 %	27 %
No Usual Site of Care			
Age Adjusted Prevalence	55 % *	33 %	12 % *
Fully Adjusted Prevalence	51 % *	34 % *	15 % *

^aCHC and HMO are abbreviations for Community Health Center and Health Maintenance Organization^bModel adjusted for age, sex, race, income, insurance type, smoking status, and number of outpatient visits in the 12 months prior to survey

* P< .05 for all comparisons with private doctor's offices/HMO

Table 4
Patient Awareness of Hypertension and Hypercholesterolemia by Site of Care ^a

Variable	Private Doctors Office/HMO	Community Health Center/ Clinic	Hospital Outpatient Clinic	Emergency Room	No Usual Site of Care
Hypertension (N = 9,440)					
Partially Adjusted Proportion of Participants Unaware of Condition ^b	39 %	39 %	33 %	46 % *	61 % *
Fully Adjusted Proportion of Participants Unaware of Condition ^c	40 %	39 %	35 %	41 %	52 % *
Fully Adjusted Odds Ratios (95% CI) ^c	Ref.	0.94 (0.76, 1.18)	0.78 (0.44, 1.18)	1.02 (0.50, 2.08)	1.71 * (1.18, 2.48)
Hypercholesterolemia (N = 4432)					
Partially Adjusted Proportion of Participants Unaware of Condition ^b	61 %	62 %	62 %	72 % *	71 % *
Fully Adjusted Proportion of Participants Unaware of Condition ^c	62 %	63 %	62 %	70 %	69 % *
Fully Adjusted Odds Ratios (95% CI) ^c	Ref.	1.05 (0.90, 1.22)	1.02 (0.66, 1.59)	1.54 (0.95, 2.49)	1.36 * (1.09, 1.69)

^a CHC and HMO are abbreviations for Community Health Center and Health Maintenance Organization

^b Model adjusted for Age, Gender, Race, Insurance Type, Income, and Smoking Status

^c Model adjusted for previous covariates and number of outpatient visits over the 12 months prior to survey administration

* P < .05 for all comparisons with private doctor's offices/HMO

Table 5
Age-Adjusted and Fully Adjusted Prevalence of Cardiovascular Conditions by Site of Care^{a,b}

Condition	Private Doctors Office/HMO	CHC/ Clinic	Hospital Outpatient Clinic	Emergency Room	No Usual Site of Care
Prior Myocardial Infarction					
Age –Adjusted Proportion	4 %	4 %	5 %	12 % *	2 %
Fully Adjusted Proportion	4 %	4 %	3 %	11 % *	3 %
Fully Adjusted Odds Ratio (95 % CI)	Ref.	0.97 (0.77,1.22)	0.83 (0.50,1.39)	4.18 (2.52,6.95)	0.78 (0.37,1.63)
Prior Stroke					
Age –Adjusted Proportion	3 %	3 %	4 %	6 % *	1 % *
Fully Adjusted Proportion	3 %	2 %	3 %	6 % *	2 %
Fully Adjusted Odds Ratio (95 % CI)	Ref.	0.94 (0.68,1.29)	1.11 (0.70,1.75)	2.21 (1.08,4.55)	0.73 (0.38,1.42)
History of Coronary Heart Disease					
Age –Adjusted Proportion	4 %	4 %	5 %	7 % *	1 % *
Fully Adjusted Proportion	4 %	4 %	4 %	8 % *	2 %
Fully Adjusted Odds Ratio (95 % CI)	Ref.	1.05 (0.77,1.44)	1.03 (0.59,1.77)	2.86 (1.78,4.59)	0.55 (0.25,1.25)
Prior Heart Failure					
Age –Adjusted Proportion	2 %	3 %	5 % *	7 % *	1 % *
Fully Adjusted Proportion	2 %	3 %	3 %	7 % *	2 %
Fully Adjusted Odds Ratio (95 % CI)	Ref.	1.06 (0.81,1.38)	1.28 (0.77,2.11)	3.62 (1.80,7.26)	0.60 (0.30,1.22)
Angina Pectoris					

Condition	Private Doctors Office/HMO	CHC/ Clinic	Hospital Outpatient Clinic	Emergency Room	No Usual Site of Care
Age-Adjusted Proportion	3 %	3 %	5 %	7 % *	1 % *
Fully Adjusted Proportion	3 %	3 %	4 %	8 % *	1 % *
Fully Adjusted Odds Ratio (95 % CI)	Ref.	1.03 (0.77,1.37)	1.41 (0.86,2.29)	3.13 (1.77,5.53)	0.43 (0.25,0.72)

^a CHC and HMO are abbreviations for Community Health Center and Health Maintenance Organization

^b Model adjusted for age, sex, race, income, insurance type, smoking status, and number of outpatient visits in the 12 months prior to survey

* P< .05 for all comparisons with private doctor's offices/HMO