Presence of a Community Health Center and Uninsured Emergency Department Visit Rates in Rural Counties

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Abstract

CONTEXT—Community health centers (CHCs) provide essential access to a primary care medical home for the uninsured, especially in rural communities with no other primary care safety net. CHCs could potentially reduce uninsured emergency department (ED) visits in rural communities.

PURPOSE—We compared uninsured ED visit rates between rural counties in Georgia which have a community health center clinic site *vs.* counties without a CHC presence.

METHODS—We analyzed data from 100% of ED visits occurring in 117 rural (non-metropolitan statistical area [MSA]) counties in Georgia from 2003-2005. Counties were classified as having a CHC presence if a federally funded (Section 330) community health center had a primary care delivery site in that county throughout the study period. The main outcome measure was uninsured ED visit rates among the uninsured (all-cause ED visits and visits for ambulatory care sensitive conditions). Poisson regression models were used to examine the relationship between ED rates and presence of a CHC. To assure that the effects were unique to the uninsured population, we ran similar analyses on insured ED visits.

FINDINGS—Counties without a community health center primary care clinic site had 33% higher rates of uninsured all-cause ED visits per 10,000 uninsured population compared with non-CHC counties (rate ratio=1.33, 95% CI=1.11-1.59). Higher ED visit rates remained significant (RR=1.21, 95% CI=1.02-1.42) after adjustment for percent of population below poverty level, percent black, and number of hospitals. Uninsured ED visit rates were also higher for various categories of diagnoses, but remained statistically significant on multivariate analysis only for ambulatory care sensitive conditions (adjusted RR=1.22, 95% CI=1.01-1.47). No such relationship was found for ED visit rates of insured patients (RR=1.06, 95% CI=0.92-1.22).

CONCLUSIONS—Absence of a community health center is associated with a substantial excess in uninsured ED visits in rural counties, an excess not seen for ED visit rates among the insured.

Keywords

Primary Care; Access to Care; Emergency Department; Community Health Centers; Safety Net; Uninsured

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A large proportion of patients visiting emergency departments have problems that could have been managed appropriately in general primary care practice. [1,2] ED visits by uninsured patients create a special problem for hospitals and for society, because the burden of indigent care in a costly ED-setting is borne by other patients, payors, and their communities. In most states, uninsured rates are higher in rural areas than urban, and the financial burden of uninsured ED visits has a direct impact on the financial viability of small rural hospitals.[3] Applying South Carolina billing data to national ED visit data, Bennett *et al* projected that rural self-pay patients accounted for an estimated $5.3 billion in ED-related charges in the year 2000.[4] The burden of cost also falls on the uninsured themselves, who personally paid 47% of their own ED costs out-of-pocket. In some settings, inappropriate use of the ED may also contribute to the problem of emergency department (ED) crowding. [5,6]

Aside from cost factors, some patients simply choose to use the ED because care is more comprehensive and convenient.[7] Being uninsured is not by itself a risk factor for increased ED visits, but ED visits are higher among those in poor health and whose regular care is disrupted.[8] ED visits may also represent a larger proportion of total health care use for the uninsured and for minority patients because their access to office-based primary care is less. [9,10] Lack of access to quality health care is especially a concern in rural areas. Although about 20% of Americans live in rural areas, only 9% of physicians practice there.[11]

One strategy for reducing unnecessary ED utilization is to promote access to primary care in settings that specifically serve the uninsured, who might otherwise have no medical home. Over the past four decades, community health centers (CHCs) and other federally qualified health centers (such as health centers serving migrant, homeless, and public housing populations) have provided a very important source of primary health care for low income and medically underserved urban and rural residents. In 2004, 91% of 15 million health center patients nationwide had family incomes at or below 200% the Federal Poverty Level. About 40% of health center patients were not covered by insurance and another 36% were covered by Medicaid.[12] More than half of CHC patients are African-American, Hispanic or Latino, or American-Indian. CHCs should be distinguished from rural health clinics (RHCs), which can qualify for enhanced Medicare/Medicaid reimbursement by increasing the availability of primary care professionals (including mid-level practitioners) in rural communities, but they do not receive grant funding explicitly to care for the uninsured.[13]

Access to affordable health care through a CHC may reduce unnecessary reliance on emergency departments among the uninsured. A study in one community showed that within three years of establishing a CHC, uninsured visits to the local hospital ED decreased by almost 40%, while insured ED visits continued to grow.[14] In a follow-up study, after 10 years, uninsured ED visits remained 25% lower than when public funding of the CHC began.[15] The decreased number of uninsured ED visits also saved the hospital and uninsured patients almost $14 million. More recently, the National Association of Community Health Centers has published a monograph citing uncontrolled case-studies of health center impact on reducing ED visits, and suggested that CHCs could potentially effect a $4 billion reduction in ED visits nationwide.[16]

However, more rigorous and population-based evidence on the association between CHCs and ED use by the uninsured is especially limited, particularly with regard to rural communities. Therefore, we undertook this study to compare uninsured ED visit rates between rural counties in Georgia which have a community health center clinic site *vs.* counties without a CHC presence.

Methods

Study Setting and Population

The purpose of this study was to compare uninsured ED visit rates between rural counties in Georgia which have a community health center clinic site *vs.* rural counties without a CHC presence. Counties were categorized as rural or non-rural based on their 2003 Metropolitan Statistical Area status as defined by the U.S. Census Bureau. The study included all of Georgia's 117 rural (non-MSA) counties.

Source of Data

ED visit data were obtained under a data use agreement with the Georgia Hospital Association. Emergency department visit data were added to the existing hospital discharge data collection system in 2002. These reflect administrative data, not clinical records, with one record per ED visit. We analyzed data from 100% of ED visits for patients 18-64 years old occurring in Georgia's rural counties from 2003-2005. Rural counties were selected in part because they are less likely to have multiple, overlapping safety net primary care service delivery agencies, making the impact of CHCs more directly measurable. Patients were categorized as insured or uninsured for each visit. We categorized patients as uninsured if the payor variable identified no public or private insurance, and no alternative payment source. For the denominator of our uninsured ED visit rates, we used the U.S. Census Bureau decennial count of the number of uninsured in each county for 2000.

Independent (Predictor) Variable

Community health centers are community-owned organizations that provide comprehensive primary care regardless of ability to pay, using a sliding scale fee structure subsidized by grants from the Health Resources and Services Administration's Bureau of Primary Health Care under Section 330 of the US Public Health Service Act. Other federally qualified health centers include health centers serving specific sub-populations such as migrant, homeless, and public housing communities. These other categories of federally qualified health centers were not a significant source of year-round care in Georgia's rural counties, so our analyses are specific to Section 330 CHCs. All CHCs and their satellite clinics in the non-MSA Georgia counties were identified. Counties were classified as having a CHC-presence if a community health center had a clinical delivery site (main office or satellite clinic) offering comprehensive primary care within that county's borders throughout the study period (January 1, 2003 through December 31, 2005). Since we focused on rural counties, we also ran an analysis on counties which had a rural health clinic (RHC) but not a CHC, *vs.* counties with neither a CHC nor RHC, but the sample size of RHC counties without a CHC was small (n=8).

Dependent (Outcome) Variable

Emergency department visits were identified and categorized by clinical reason for the ED visit. Counts for each county were then determined. Visit rates per 10,000 uninsured per year were calculated by dividing the three-year total counts by three and dividing by the U.S. Census Bureau counts of the uninsured population (year 2000) for each county. All analyses were performed first on uninsured emergency encounters, then repeated on visit rates by insured patients, to assure that our outcomes specifically reflected differences among the uninsured.

In addition to measuring total ED visits for the uninsured, we also categorized the principal diagnosis or the reason for the ED visit as either an ambulatory care sensitive condition (ACSC) or non-ACSC. ACSCs are conditions for which hospitalizations may have been prevented, or conditions that might have been less serious, if they had received early,

appropriate primary care. Twenty-eight ACS conditions were flagged by ICD-9 code using standard lists promulgated by the Agency for Healthcare Research and Quality (AHRQ). [17,18]

We also used software algorithms developed by Billings *et al* at the Center for Health and Public Research at New York University to sort ED visits first into emergent *vs*. non-emergent (excluding mental health & substance abuse-related conditions), then dividing emergent visits into those which were primary care treatable *vs*. those requiring ED-care, and finally dividing the emergent conditions requiring true ED-care into those which might or might not have been "preventable or avoidable". [19,20]

For statistical analysis, we followed the methodology of Billings *et al* and re-classified ED visits into one of the following four categories (after excluding visits for mental health / substance abuse):[21]

- Non-emergency (primary care treatable by definition)

- Emergency, but primary care treatable

- Emergency, ED care needed but primary care preventable

- Emergency, ED care needed and not primary care preventable

The algorithm assigns a probability to each visit for each category. If the probability for a category was greater than or equal to 0.80, then the visit was assigned to this category.

We also examined emergency department visits for chronic conditions which are among the most common diagnoses seen in community health center practices (diabetes, hypertension, and asthma), and for which ED visits may be considered largely preventable. Specifically, visits to the ED for uncontrolled diabetes or hypertension or asthma by uninsured patients may reflect on the effectiveness of the primary care safety net. Diabetes related encounters were identified as such if the principal diagnosis ICD-9 code for the encounter was in the range of 250-250.99. Hypertension related encounters were if identified as such if the principal diagnosis ICD-9 code for the encounter was in the range of 401-405.99 or 437.2-437.29. Asthma related encounters were identified as such if the principal diagnosis ICD-9 code for the encounter was in the range of 493-493.99.

Covariates

The unit of analysis for this study is the county (uninsured ED visit rates at the county level), so we intentionally only controlled for county-level covariates.[22,23] Our data set unfortunately did not allow us to identify individual persons in the visit-level data so we are not able to control for person-level clustering (multiple visits by one individual), and we could not tie the person-level characteristics associated with each ED visit to the denominator population in our Poisson models. However, we did control for county aggregates of individual level variables that might influence health care utilization.[24,25]

Since we were evaluating the impact of primary care safety net clinics on health care utilization at the county-level, we assessed the impact of contextual variables describing the community such as population density, percent population below poverty level, percent of population aged 65 and older, percent black population, and percent Latino population for each county. We also assessed potential county-level covariates describing local health care resources, such as the number of hospitals with an emergency department, [26] and the number of adult-focused primary care physicians (Family Practice and Internal Medicine) per 100,000 total population for the patient's county of residence. [27] Several of these variables were omitted from the final analysis, because they did not add independently to the

multivariate models, nor did they influence the association between presence of a CHC and the outcome measures. A final list of covariates appears in Table 3.

Statistical Analyses

All statistical analyses were done using SAS version 9. We calculated rates and 95% confidence intervals for each of the outcome variables and covariates. Poisson models were used for the bivariate analyses instead of T-tests to account for the non-normal distribution of visit rates. Poisson models were also fitted for the multivariate analyses, because of the non-negative nature of rate data. Rate ratios were calculated by using the log of the county uninsured population as the offset variable for the Poisson models in the GENMOD procedure. The rate ratio produced is the weighted rate for counties without a CHC divided by the weighted rate for counties with a CHC. The scaled deviance of each model was greater than one, suggesting over-dispersion of the variance of the rates in relation to the mean of the rates, thus violating a key assumption of ordinary Poisson regression models. To overcome this limitation, we fit over-dispersed Poisson models (which estimate a parameter for the scaled deviance) to the data to account for the population of each county when calculating rate ratios and 95% Confidence Intervals. 28 Multivariate Poisson regression models (adjusted for overdispersion) were estimated to assess the independent association of community health center counties with uninsured ED visit rates, while controlling for the county-level population and health system covariates described above. All p-values are two-tailed, with values less than 0.05 considered statistically significant.

Results

Table 1 presents the characteristics of counties with a CHC clinic site (N=24) and without a CHC (N=93). Overall the CHC and non-CHC counties are similar except that counties with a CHC tended to have a lower population density (40.0 persons per square mile, 95% CI=29.5-50.4 *vs*. 62.7 persons per square mile, 95% CI =51.2-74.3) and were less likely to have a hospital (54.2%, 95% CI=34.2-74.1 *vs*. 80.7%, 95% CI=72.6-88.7). These factors were controlled for in our multivariate models.

There were 2,070,778 emergency department visits captured during the years 2003-2005 in rural Georgia counties, with 695,690 (33.6%) reporting no health insurance (self-pay or uninsured). 615,789 visits (34 % uninsured) were attributed to patients residing in counties without a CHC, while 79,901(30.7% uninsured) were for patients residing in counties with a CHC. Demographic characteristics of the patient for each uninsured ED visit are summarized in Table 2, and show that sex, age, and race/ethnicity for persons making ED visits were quite similar for both CHC and non-CHC counties.

Non-CHC counties had a higher rate of all types of ED visits compared to counties with a CHC (Table 3). They had a 33% greater rate of all emergency room visits (RR=1.33, 95% CI 1.11-1.59), and 37% greater risk of ACS condition visits (RR=1.37, 95% CI=1.11-1.70). On bivariate analysis all categories of visits (including "emergency-care needed" visits) were higher, but only total ED visits (RR=1.21, 95%CI = 1.02-1.42) and visits for ambulatory-care-sensitive conditions (RR=1.22, 95%CI = 1.01-1.47) remained significant after adjustment for percent population below poverty level, percent black population, and number of hospitals (Table 3). As expected, confidence intervals were much wider after adjusting for over-dispersion.

In order to assure that these findings did not reflect some unmeasured secular difference between CHC and non-CHC counties that would affect ED visit rates universally, we ran the same analysis for ED visits by insured patients, and found that the outcomes were unique to the uninsured. Total ED visit rates for insured patients were not significantly higher in the

non-CHC counties (adjusted RR=1.06, 95% CI = 0.92-1.22; Table 4); neither was there any CHC *vs.* non-CHC county difference found for ambulatory-care-sensitive conditions among the insured (adjusted RR=1.07, 95% CI = 0.90-1.27; Table 4).

Finally, we compared the eight counties with only a rural health clinic (RHC) and no CHC *vs.* counties with neither RHC nor CHC, and found no reduction in uninsured ED visit rates. To the contrary, we found that RHCs appeared to be a marker for higher need counties, with higher rates of uninsured total ED visits than in counties with no safety net clinic at all (adjusted RR=1.29, 95% CI = 1.10-1.51; data not shown in tables), as well as higher rates of uninsured visits for ambulatory-care-sensitive conditions (RR=1.40, 95% CI = 1.16-1.67; data not shown). This suggests that our findings with regard to ED visit rates are unique to the uninsured segment of the population, and also unique to CHCs *vs.* RHCs.

Discussion

The main finding of this study is that rural counties without a community health center have significantly higher uninsured ED visit rates than do rural counties with a CHC clinic site, even after controlling for various county-level covariates which might also effect ED-utilization. Presence or absence of a CHC had no effect on ED visit rates by insured patients.

Uninsured ED visits represent a significant problem in Georgia. Of the roughly two million ED visits by non-elderly, adult patients occurring in Georgia in this three-year period, roughly one-third were visits by the uninsured, even though only 18% of Georgia's non-elderly adults are uninsured. CHCs clearly play a major role as a primary care safety net in Georgia. In 2003, 43.5% of the patient visits provided by Georgia's nineteen community health center organizations (76 clinic sites) were to uninsured patients. Sixty-nine percent of patients were African-American or Latino, and 70% had documented family incomes below 200% of the federal poverty level.

Our findings are consistent with earlier studies showing that primary care access can reduce ED visit rates. For example, national data show a positive association between primary care shortage densities and ED visit densities.[29] Mauskopf *et al* 1994 reported that New York State Medicaid HIV patients without a usual source of primary care had higher odds of ED use than patients with a medical home.[30] Falik *et al* have also shown that Medicaid patients enrolled as patients in a comprehensive community health center have fewer ambulatory care sensitive ED visits than other Medicaid clients, even after controlling for case-mix.[31] A survey of 700 patients waiting for ED care at a public hospital showed that patients with a regular source of care used the ED more appropriately than did patients without a regular source of care.[32]

Oster and Bindman found evidence in the National Hospital Ambulatory Care Survey that not having a primary care home led uninsured and minority patients to have higher rates of preventable hospitalization.[33] In fact, expanding Medicaid coverage to all poor adults in Oregon may actually have increased hospitalization rates for preventable conditions, because it lowered financial access barriers to hospital admission for the newly insured without first assuring appropriate use of a primary care medical home.[34]

However, none of these studies specifically addressed the impact of primary care safety net health centers such as CHCs on indigent care ED visits by the uninsured, and the few published studies looking at CHCs and uninsured ED visits have been uncontrolled case studies. Communities with no CHC or other primary care safety net might naturally expect increased uninsured visits to the ED, which becomes the "safety-net for the safety-net", especially since the Emergency Medicine Treatment and Labor Act (EMTALA) mandates

that emergency departments evaluate all patients regardless of insurance status or ability to pay.35

Community health centers play an important role in reducing access barriers to primary care services in rural areas. Compared to the general rural population, rural community health center patients are more likely to receive certain preventive services and to experience lower rates of low birth weight, particularly for African American infants.36 CHCs are specifically charged with providing a comprehensive primary care medical home for patients who might otherwise not be able to access care, and they specifically are mandated to offer sliding-scale, reduced fee care to the uninsured based on income level and ability to pay. This is a more relevant measure of primary care access for the uninsured than is the simple availability of primary care physicians in the county, who serve primarily insured patients. In fact in our preliminary analyses, the number of primary care physicians per 100,000 population had absolutely no effect on multivariate models of uninsured ED visits.

Studies by Starfield *et al* had previously shown a significant impact of primary care physician supply on total mortality, disease-specific mortality, and hospitalizations for ambulatory care sensitive conditions, but did not specifically focus on ED visits or on the uninsured.37,38 For the uninsured, our findings suggest that primary care access is indeed important, but only when we look at the segment of primary care providers actually providing care to substantial numbers of uninsured patients (*i.e*., CHCs). We did not have the ability in these data to identify private-practice primary care practitioners (if any) serving large numbers of uninsured patients, but at least related to the outcome of ED visits for the uninsured, the presence of a CHC was more significant than was the overall number of primary care clinicians serving the broader population.

Similarly, our results indicate that even providing enhanced Medicare-Medicaid reimbursement to practices that use mid-level practitioners to expand capacity in underserved rural areas through the Rural Health Clinic model did not have any effect on reducing ED visits among the uninsured. In contrast to CHCs, RHCs do not receive a federal grant to subsidize care for the uninsured, and therefore have a very limited capacity to provide a primary care home for the uninsured. Our data actually suggest that RHCs may be a marker for high-need counties, which indeed have higher rates of uninsured ED visits and perhaps might benefit from the presence of a comprehensive, federally-funded CHC.

The importance of CHCs in improving access to primary care for underserved populations has been increasingly recognized. In 2002, Congress passed an initiative to serve an additional 6.1 million persons by building new CHC access points and expanding existing facilities to provide primary care homes for uninsured and high-disparity populations.39, 40 These expansions may be offset by on-going increases in the uninsured population, as well as state and federal Medicaid cutbacks which could increase financial pressures on CHCs. Additional research will be needed to assess the impact of these CHC expansions on uninsured ED visits and hospitalizations in rural areas, as well as on the long-term financial viability of rural hospitals. Attention to proportionate expansion of the National Health Service Corps and Title VII mechanisms for enhancing the production of primary care physicians willing to serve in underserved areas may also be a limiting factor to further expansion, especially in rural communities.41

We expected to find a substantial impact of CHCs on ED visits for ambulatory care sensitive conditions, or primary care treatable conditions. We were somewhat troubled to see higher rates of "true-emergency, non-preventable" ED visit rates in non-CHC counties, but these were not statistically significant after adjustment for covariates and over-dispersion. It is plausible, however, that patients who have an established relationship with a comprehensive

primary care community health center as their medical home may choose to go there even for urgent conditions. The farmworker with a broken arm, for example, who goes to the health center, gets an x-ray and a splint and a referral to an orthopedist, would be categorized as having a "true emergency", but might still have received more cost-effective care from the CHC than they would from the ED. An alternative explanation is that one or more unrecognized covariates affecting ED use have also somehow affected the placement of a CHC in a given community, but this did not show up in ED visit rates for insured patients.

One limitation of this study is that it relied on hospital-generated reports of ED-visits, similar to hospital discharge data. These data are most reliable for elements that are tied to payment of claims, such as diagnosis, date-of-service, etc., and are less reliable for unrelated fields such as Hispanic ethnicity. Diagnosis codes on billing claims also do not always reflect the complexity of reasons for the visit which might be found in the clinical record. Unfortunately, there was no unique identification number for each individual person in the database, so that we could not flag multiple visits by the same person, or look separately at persons who might be frequent utilizers of ED visits.

We did assess the ratio of ACSC visits to "non-preventable, true-emergency" visits in order to eliminate the effect of uncertainties in the uninsured counts as a denominator, and we still found a significant (albeit smaller) impact of CHCs on ACSC visits relative to "true-emergencies" (data not shown). Unfortunately, this would under-estimate the impact of CHCs if they reduce both ACSC and non-ACSC visits, as our analysis of rates would indicate.

Another limitation is that these data do not allow us to assess the primary care safety net more deeply than the simple presence or absence of a safety net clinic site for the uninsured. Some of these clinics might have a very robust capacity to serve the uninsured population from a wide catchment area, while smaller clinics might have a smaller capacity or lower market penetration among the uninsured. Because CHCs report their number of uninsured users by organization rather than by clinic site (each CHC might have one or more satellite clinic locations in multiple counties), we could not control for the uninsured CHC patient volumes in each county. We could only determine the patient's county of residence and compare it with the county in which the CHC had a clinic site. We also know that in a few of the non-CHC counties there are free clinics (often faith-based volunteer clinics) offering services to the uninsured, but usually at much lower volumes than those offered by the CHCs. If they had an impact on our analysis, they would have reduced ED visit rates in the non-CHC counties, which would actually bias our results in the direction of finding no difference between CHC and non-CHC counties.

Finally, our data come only from one state, albeit one with a large number of rural counties. Southern states are known for having higher uninsured rates, less generous Medicaid eligibility criteria, less adequate supplies of health professionals in rural areas, and overall poorer health outcomes. In an unpublished study from South Carolina's Rural Health Research Center, the presence of a CHC was associated with a decreased ED visit rate (from 37.4 per 100 persons per year to 31.0 visits per 100 persons.[42] Further research will be needed to determine if these results are generalizable to rural areas in other regions of the U.S.

We conclude that there is a significant excess of uninsured ED visits in rural counties that do not have a federally-funded community health center clinic site, compared with CHC counties, even after controlling for various county-level covariates which might also effect ED-utilization. This excess is unique to the uninsured segment of the population, which

CHCs have a unique capacity to serve. RHCs did not have a similar protective effect. CHCs have the potential to prevent emergency visits by providing a primary care medical home for best-practice chronic disease care and preventive services. They are also a more cost-effective and care-appropriate setting for managing acute but primary-care-treatable episodes of care. Further research is needed to directly assess the proportion of uninsured clients from each county receiving care in CHCs and having ED visits for emergent and non-emergent conditions, and also to quantify the economic benefit attributable to the CHC-associated reduction in uninsured ED visit rates.

Acknowledgments

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Table 1

Characteristics of Counties with and without a Community Health Center (CHC).

	Counties Without FQHC	Counties With FQHC
	Mean (95% CI)	**Mean (95% CI)**
Number of Counties	93	24
2004 Population	1,351,919	215,559
Population Density (persons per square mile)[*]	62.7 (51.2-74.3)	40.0 (29.5-50.4)
Percent Age 65+	12.7 (12.1-13.4)	14.0 (12.8-15.2)
Percent Black	27.9 (24.6-31.2)	35.3 (26.3-44.2)
Percent Latino	3.6 (2.8-4.4)	2.3 (.90-3.7)
Percent Poverty	17.7 (16.8-18.6)	18.9 (16.9-20.9)
At least one Hospital[*]	80.7% (72.6-88.7)	54.2% (34.2-74.1)
Rate of Primary Care Physicians/100,000 Population	45.7 (41.1-50.3)	47.9 (38.2-57.8)

[*] t-test p<.05

Table 2

Demographic profile of ED visits in Counties with and without a CHC.

	CHC	Non-CHC
Total	79,901	615,789
Sex [*]		
Female	39,954 (50.0%)	322,203 (52.3%)
Male	39945 (50.0%)	293547 (47.7%)
Race [*]		
Black or African-American	28,054 (35.1%)	173,073 (28.1%)
White	47,307 (59.2%)	382,919 (62.2%)
Hispanic/Latino	4,427 (5.5%)	58,731 (9.5%)
Other	70 (0.1%)	769 (0.1%)
Mean Age, years [*] **(SD)**	34.1 (11.3)	33.9 (11.2)

[*] chi square or t-test p<.0001

Table 3

Mean Annual Rate, Crude and Adjusted Rate Ratios of Emergency Department Visits among *Uninsured* Adults in non-CHC *vs.* CHC Counties, 2003-2005.

	Number of Events, 2003-2005		Mean Annual Rate		Unadjusted Model		Adjusted** Model	
	No CHC	CHC	No CHC	CHC	RR	95% CI	RR	95% CI
All Emergency visits	615,789	79,901	7343	5510	1.33	1.11-1.59	1.21	1.02-1.42
Ambulatory Care Sensitive Conditions	131,095	16,508	1563	1138	1.37	1.11-1.70	1.22	1.01-1.47
Non-Emergent or Emergent Primary Care Treatable	89,447	11,802	1067	814	1.31	1.06-1.62	1.18	0.97-1.43
Emergent, ED Care Needed	25,409	3,617	303	249	1.21	1.03-1.44	1.11	0.95-1.31
Diabetes	3,272	430	39	30	1.32	1.04-1.66	1.24	0.98-1.56
Asthma	6,169	806	73	56	1.32	1.04-1.68	1.21	0.95-1.53
Hypertension	4,854	716	58	49	1.17	0.91-1.51	1.20	1.11-1.30

*
Rates calculated per 10,000 uninsured adults, based on year 2000 census estimates of uninsured: No CHC: 279,536 CHC: 48,340.

**
Poisson regression model adjusted for percent black population, percent population below poverty level, number of hospitals and overdispersion of variance.

Table 4

Mean Annual Rate, Crude and Adjusted Rate Ratios of Emergency Department Visits among *Insured* Adults in non-CHC *vs.* CHC Counties, 2003-2005.

	Number of Events, 2003-2005		Mean Annual Rate		Unadjusted Model		Adjusted Model*	
	No CHC	CHC	No CHC	CHC	RR	95% CI	RR	95% CI
All Emergency visits	1189135	179585	3696	3580	1.03	0.88-1.21	1.06	0.92-1.22
Ambulatory Care Sensitive Conditions	216435	32351	673	644	1.04	0.86-1.26	1.07	0.90-1.27
Non-Emergent or Emergent Primary Care Treatable	156077	22582	485	450	1.08	0.89-1.30	1.09	0.91-1.30
Emergent, ED Care Needed	62431	10103	194	201	0.96	0.83-1.12	0.98	0.86-1.13
Diabetes	8300	1449	26	29	0.89	0.71-1.12	0.95	0.78-1.17
Asthma	11543	1844	36	37	0.98	0.78-1.23	1.06	0.86-1.30
Hypertension	9402	1665	29	33	0.87	0.67-1.14	1.01	0.81-1.26

*
Rates calculated per 10,000 uninsured adults, based on year 2000 census estimates of uninsured; No CHC: 1,072,383 CHC: 167,219.

**
Poisson regression model adjusted for percent black population, percent population below poverty level, number of hospitals and overdispersion of variance.