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The Influence of Federally Qualified Health Centers on Selected Ambulatory Care Sensitive Conditions in Georgia

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THE INFLUENCE OF FEDERALLY QUALIFIED HEALTH CENTERS ON
SELECTED AMBULATORY CARE SENSITIVE CONDITIONS IN GEORGIA

by

MARY W. KING-MATHIS

(Under the Direction of Gerald R. Ledlow)

ABSTRACT

Ambulatory care sensitive conditions (ACSCs) resulting in hospitalizations make up a substantial proportion of health care costs, but should not because these conditions are manageable in quality primary care settings that promote prevention in an effort to avoid exacerbations that can lead to hospitalization. The use of emergency departments (EDs) as a safety net for ACSCs has increased the burden on hospitals because patients who do not regularly utilize primary care often resort to the use of EDs for treatment of ACSCs. Federally qualified health centers (FQHCs) are designed to provide consistent, high-quality primary care to all people, but provisions are in place to ensure that economically vulnerable populations also have access to quality primary care. FQHCs are primary care access points that guarantee variable rates as determined by patient income, and the patient knows ahead of time what the costs will be.

In this study, hospital and ED discharges for ambulatory care sensitive chronic conditions (ACSCCs) were used as indicators of quality primary care. Hospital discharges represented indicators of low utilization of primary care leading to hospital level needs due to exacerbations of ACSCCs, and ED discharges were used as indicators of the ED as a safety net. A general linear model was used to determine per capita rate variations in hospital and ED discharges for ACSCCs in counties before and after FQHC

additions. In the final model, race, payer-type, and age, overall, showed significant variations in hospital and ED discharges.

Findings from this study indicated that most counties with FQHC presence had had lower hospital and ED discharge rates. Counties with multiple FQHCs showed greater improvement in discharge rates and rural counties showed the least improvement in rates, overall. There is a need for further exploration to understand reasons for increases in hospital and ED discharges for some years during the study period.

Additionally, health care utilization behavior and social interactions may further inform researchers about the effects of wait times, hours of operation, co-pays, and other factors not measured in this study.

INDEX WORDS: Federally Qualified Health Centers (FHQCs), Community Health Centers (CHCs), Ambulatory Care Sensitive Conditions, Chronic Conditions, Primary Care, Hospital Discharges, Emergency Department, Health Care Access

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SELECTED AMBULATORY CARE SENSITIVE CONDITIONS IN GEORGIA

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A Dissertation Submitted to the Graduate Faculty of Georgia Southern University in
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DOCTOR OF PUBLIC HEALTH

STATESBORO, GEORGIA

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DEDICATION

This dissertation is dedicated to all who have endured hardships in enjoying consistent, high quality, and readily accessible primary care in the United States and to those who strive to improve accessibility to high quality primary care.

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CHAPTER 1

INTRODUCTION

Background

A major contributor to health care costs is the utilization of hospital level care and emergency departments for conditions that could have been managed in a primary care setting. Underuse of preventive care, low literacy about managing chronic conditions, lack of coordination of care, and lack of comprehensive healthcare coverage for primary care all contribute to avoidable hospitalizations and emergency department use that could have been avoided (The Commonwealth Fund, 2012). Cost-containment measures have shifted some inpatient care to outpatient settings, and in one publication it was suggested that hospitalization reductions have reached a plateau (Bernstein, Hing, Moss, Allen, Siller, Tiggler, et al., 2003); however, this point is arguable because there are conditions that make up a substantial portion of hospital and emergency department discharges that are avoidable.

Ambulatory Care Sensitive Conditions

Ambulatory care sensitive conditions (ACSCs) are defined as “Conditions that respond to timely and effective care in the outpatient (ambulatory) setting. ACSC's are used as Prevention Quality Indicators, and can assist in evaluating quality or use of primary health care” (Georgia Department of Public Health, 2012, para 3). These conditions are those that result in hospitalizations more often than they should. ACSC rates are used as prevention quality indicators, but this also means that to receive quality care one must have access to it first.

Chronic disease conditions account for a substantial portion of ambulatory care visits in the U.S., and a large proportion of those events require the most extreme and expensive healthcare interventions (the emergency department [ED] and hospitalizations), to return patients to stable health. Direct and indirect costs in lost productivity, for patients and their caregivers, from chronic disease are extremely costly to the U.S. Having access to a regular source of primary care reduces the potential for poor chronic disease outcomes.

Summary of ACSC Hospital Discharge Rates in Georgia

During the period 2000 – 2009, there were 451,087 ACSC hospitalizations for acute conditions among adults 18-64 years of age and 86,468 ACSC hospitalizations for potentially avoidable conditions during the same period among adults of the same age (Georgia DCH, Dept. of PH, Office of Health Information Planning, 2011). The total number of all ACSC hospitalizations was 857,726 for the same period and age group, with chronic conditions representing 37.3% (320,171) of all ACSC hospitalizations (Georgia DCH, Dept. of PH, Office of Health Information Planning, 2011). Chronic conditions are ongoing, require consistent management to reduce ACSC hospitalizations, and have become an integral part of the daily healthcare system, contributing to unmanageable and unsustainable costs.

Among Georgia adults 18 to 64 years, ambulatory care sensitive condition discharges for chronic conditions numbered 320,171 from 2000 to 2009, with increases from 5.9% of all hospital discharges in 2000 to 6.6% of discharges in 2009 (Georgia DCH, Dept. of PH, Office of Health Information Planning, 2011). Direct costs (medical

care) and indirect costs (lost productivity, presenteeism¹ and absenteeism) occurring among the working age population made up of adults 18 to 64 years presents an opportunity to explore ways to reduce hospitalization rates due to ambulatory care sensitive chronic conditions (ACSCCs) in this economically productive age group. Beyond the age of 65, it is expected that the aging population will more frequently be diagnosed with chronic conditions as reported by the World Health Organization (WHO) stating that, “People aged 70 years and over usually have two or three chronic conditions...” (World Health Organization, 2003, p. 10), and before age 65, adults are commonly still employed. Among those younger than 18, chronic diseases are much less common. The adult age group 18-64 represents a vulnerable population and there should be opportunities to reduce expensive care in emergency departments and continue decreasing hospitalization rates, namely those that could be avoided.

Emergency Department Use

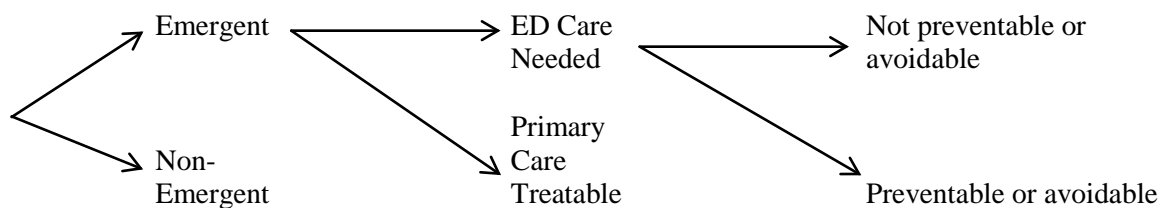
Using the emergency department for conditions that could have been managed in a primary care practice is not a desirable outcome. An algorithm (see Figure 3) depicts the classification of patient types who arrive in the emergency department. Non-emergent care refers to cases where immediate care is not required within 12 hours (e.g., sore throat). Emergent primary care treatable refers to cases where care is needed within 12 hours, but could be treated in a primary care setting (infant fever of 102° F).

¹ Presenteeism refers to chronically ill workers who come to work, rather than lose wages, by using sick days; however, lower productivity is actually greater than losses associated with absenteeism (DeVol & Bedroussian, 2007).

Emergent care for preventable/avoidable care is when immediate care is needed, but the condition could potentially have been prevented or avoided with timely and effective ambulatory care (see chronic ACSCs). Emergent, not preventable/avoidable, are those conditions that could not have been prevented or avoided with ambulatory care (multiple trauma, myocardial infarctions, strokes) (Agency for Healthcare Research and Quality, 2003). ACSCCs could fall into emergent and non-emergent classifications, depending on the stage of the condition in its progression and on the accessibility of primary care. For example, if primary care were readily available, but not utilized for health maintenance, the condition could lead to an emergent level that would require a hospitalization or treatment in the ED that could have been avoided. If however, primary care were not accessible, the outcome could be the same, but not within reasonable control of the patient.

Figure 1

Algorithm for Classifying Emergency Department Utilization



Source: (Agency for Healthcare Research and Quality, 2003)

Chronic Disease Prevalence

Chronic conditions make up a substantial proportion of U.S. health system costs, both directly and indirectly as approximately 121.3 million people in the U.S. reported diagnoses of pulmonary conditions, diabetes, hypertension, heart disease and stroke in 2003 (DeVol & Bedroussian, 2007). In 2009, approximately 17.5 million U.S. residents were reported to have asthma. From 2005-2008, 9.9 million had bronchitis, 4.9 million had emphysema, approximately 7.9% of the U.S. population 20 years and older had diabetes in 2008, 26.8 million adults had heart disease, and 33% of adults had hypertension (Centers for Disease Control and Prevention, 2011). Estimated 2007 ambulatory visits for the top 35 primary care diagnoses totaled 1.2 million in combined settings (primary care 48.1%, surgical specialty 16.4%, medical specialty 18.4%, hospital outpatient 7.4%, and hospital emergency departments 9.7%). Of the top 35 reasons for clinical visits and hospital and ED discharges, hypertension ranked 1st, diabetes mellitus 7th, asthma 14th, followed by heart disease at a ranking of 15, chronic bronchitis at 30, and the total number of visits for these conditions for all settings was approximately 118 million. Of the 118 million, 11 million visits were from hospital emergency departments (Schappert & Rechtsteiner, 2011). Most of these conditions could be managed in a primary care setting and do not require hospitalization unless they escalate in severity to a point that requires hospitalization (Laditka, Laditka, & Probst, 2009). The counts of chronic conditions have been high, but they have also been increasing each year, and lost productivity and monetary costs associated with them will continue to rise, particularly for those with chronic disability, which often require more visits to the physician.

Economic Impact of Chronic Disease

Nationally, lost productivity among people with chronic diseases accounted for a total of \$1046.7 billion in indirect costs: \$127.5 billion for lost workdays among people with chronic disease; \$80.2 billion in presenteeism; \$10.8 billion for their caregivers in lost work days; and, \$828.2 billion for presenteeism among caregivers. Direct costs for major chronic diseases (pulmonary conditions, diabetes, hypertension, heart disease, and stroke) were estimated at a cost of \$183 billion in the United States (U.S.) in 2003. In the State of Georgia, the economic impact in both direct and indirect costs was \$39.9 billion with 3.7 million Georgians reported to have the top five chronic disease groups listed earlier. In 2003 Georgia placed in the 3rd quartile of the national chronic disease index (DeVol & Bedroussian, 2007).

Rural and Urban Georgia

Rural Georgia counties represented 82,867 (25.9%) of all ambulatory care sensitive chronic condition (ACSCC) hospitalizations among those 18-64 during the years 2000 to 2009 and non-rural Georgia counties represented 237,304 (74.1%) (Georgia DCH, Dept. of PH, Office of Health Information Planning, 2011) of all cases. Non-rural Georgia counties made up the largest percentage of ACSCC hospitalizations, indicating that this relatively large cohort did not have adequate care in months prior to the hospitalization (Probst, Moore, Baxley, & Lammie, 2003), whether due lack of access, low utilization of primary care for any reason, or lower quality care. Although health disparities often point to rural areas as representing the majority of the most vulnerable populations, rural areas made up the least number of hospitalizations in Georgia at approximately 25% of ACSCC hospitalizations among 18-64 year olds during

the period 2000-2009. What was not clear from a quick review of data was if rural residents 18 to 64 years old were proportionately overrepresented for ACSCC hospitalizations. ED discharge rates were not publically available for ACSCCs.

Purpose of Study

The purpose of this study was to determine if variations existed in hospital and emergency department discharge rates for ambulatory care chronic conditions (ACSCCs) after federally qualified health centers (FQHCs) were added in Georgia counties during the 2002 to 2008 period among people ages 18 to 64 years.

Significance of Study

Research thus far has indicated that ACSCCs make up a substantial proportion of hospitalizations that could be avoided, and use of emergency departments for primary care needs has been problematic. Studies have indicated that regular access to quality primary care may reduce ACSCC hospital and ED discharges. Nearly 50% of ACSCC hospital discharges in Georgia occurred among those who were in their prime years for economic productivity, ages 18 to 64 years, a discouraging fact that could be improved. Reducing hospital emergency department discharges is necessary to reduce healthcare costs, but also to promote quality of life that should be a benefit of appropriately utilizing primary care. Primary care access and utilization are essential in reducing hospital and ED discharges, but a better understanding of the barriers to maximizing primary care use is fundamental to improving chronic disease outcomes. Thus far, a review of literature has not indicated that the impact of FQHC additions has been studied in terms of ACSCC hospital and ED discharges before and after the addition of FQHCs. This study, therefore,

will focus on rates of ACSCC hospital and ED discharges before and after additions of FQHCs throughout Georgia by race, gender, rural and non-rural status, and payer type for people 18 – 64 years of age. Ideally, an assessment of results should inform planning for future FQHC additions that ensure quality preventive care availability to everyone regardless of ability to pay.

Definitions of Terms

Ambulatory Care Sensitive Conditions (ACSC)

Acute conditions: bacterial pneumonia, cervical cancer, cellulitis, convulsions, dehydration, hypoglycemia, kidney/urinary infection, pelvic inflammatory disease, severe ear, nose, and throat infections, and skin grafts with cellulitis (Georgia DCH, Dept. of PH, Office of Health Information Planning, 2011).

Avoidable conditions: are defined as congenital syphilis, failure to thrive, certain dental conditions, vaccine preventable diseases, iron deficiency anemia, and nutritional deficiencies

Chronic conditions: Angina (ICD9 411.1, 411.8, 413); Asthma (ICD9 493); Chronic Obstructive Pulmonary Disease (ICD9 466.0, 491, 492, 494, 496); Congestive Heart Failure (ICD9 402.01, 402.11, 402.91, 428, 518.4); Diabetes with ketoacidosis or hyperosmolar coma or other coma (ICD9 250.1 – 250.33); Diabetes with other specified or unspecified complications (ICD9 250.8 – 250.93); Diabetes mellitus without mention of complications or unspecified hypoglycemia (250-250.04); Grand Mal & Other Epileptic Conditions (ICD9 345); Hypertension (ICD9 401.0, 401.9, 402.00, 4032.10, 402.90); Hypertension (ICD9 401.0, 401.9, 402.00, 402.10, 402.90); Tuberculosis [Non-

Pulmonary ICD9 012-018]; Pulmonary Tuberculosis (011) (Georgia DCH, Dept. of PH, Office of Health Information Planning, 2011, Definitions Link)

Although the definition of ACSC refers to hospitalizations as an indicator of quality preventive care, emergency department use is used as the same indicator in this research because EDs are not in the business of providing primary care; therefore, ED visits for ACSCCs are viewed as avoidable ED uses in this research.

Ambulatory Care Sensitive Chronic Conditions (ACSCCs): All conditions under the ACSC chronic category.

Federally Qualified Health Center (FQHC) also known as “Health Centers”

Health centers are community-based and patient-directed organizations that serve populations with limited access to health care. These include low income populations, the uninsured, those with limited English proficiency, migrant and seasonal farmworkers, individuals and families experiencing homelessness, and those living in public housing.

Federally Qualified Health Center Look-Alikes are health centers that have been identified by HRSA and certified by the Centers for Medicare and Medicaid Services as meeting the definition of “health center” under Section 330 of the PHS Act, although they do not receive grant funding under Section 330 (Georgia Department of Public Health, Office of Health Indicators and Planning, 2012).

Emergency Department Visits

The number of emergency room visits to non-Federal acute care inpatient facilities. Persons can be counted more than once if readmitted. Visits include people

both living and who have died, but not those admitted as an inpatient to a hospital
(Georgia Department of Public Health, 2012).

Literature Review

Ambulatory Care Sensitive Conditions

Hospitalizations for ACSCs fall into three categories: acute, avoidable, and chronic episodes (Georgia Department of Community Health [DCH], Division of Public Health [DPH], Office of Health Indicators for Planning [OHIP], 2011). As stated earlier, ambulatory care sensitive conditions that end in hospitalizations are those health conditions that, if the patient receives adequate outpatient care, should not result in a hospitalization (Probst, Moore, Baxley, & Lammie, 2003) because ACSCs are indicators of the effectiveness (and availability) of quality preventive care (Georgia DCH, Dept. of PH, OHIP, 2011).

ACSC rates can be used to indicate where health disparities exist, which is most frequent among disadvantaged populations—those with low income and education, and minorities (Bindman, Grumbach, Osmond, Komaromy, Vranizan, Lurie, et al, 1995). Ambulatory care sensitive chronic conditions (ACSCCs) are manageable with consistent use of primary care, which would otherwise lead to hospitalization (Laditka, Laditka, & Probst, 2009).

Certain chronic conditions require ongoing and regular management to reduce the likelihood that these conditions escalate from a manageable level in the primary care clinic to a hospitalization that could have been avoided. Research has demonstrated that the most effective management of chronic conditions requires a regular source of primary care due to the effectiveness of case management and education that help reduce poor outcomes (Department of Health and Human Services, 2012). Access to timely and

regular primary care is not only reliant on healthcare-seeking behavior, but also on conditions external to the user such as distance, waiting time, availability of primary care providers, and affordability, all access-related issues. Provisions for primary care in rural and highly dense population areas may not be adequate for chronic disease management as maldistribution of quality primary care contributes to poorer health outcomes.

Accessibility is critical to utilization of primary care, but is dependent on distance/travel time, and the distribution of primary care may not be adequate to meet needs.

ACSC Hospitalizations as Indicators of Quality Preventive Care

Ambulatory care sensitive conditions (ACSCs) that result in hospitalizations are an indicator used to assess accessibility and effectiveness of primary care, which means that at some point prior to hospitalization, healthcare was not utilized optimally. The Institute of Medicine (IOM) defined access as, “the timely use of personal health services to achieve the best possible health outcomes...availability, accessibility, affordability, accommodation (relationship between practitioner and patient) and acceptability of care are integral components of the construct of access.” (Gamm, Castillo, & Pittman, n.d., p 17). This review of literature provides insight into access issues that may result in hospital and emergency department discharges.

If primary care is utilized consistently and standards for preventive treatment are ensured, hospitalizations for certain conditions (ACSCs) are usually preventable (Ansari & Laditka, 2006; Mobley, Root, Anselin, Lozano-Gracia, & Koschinsky, 2006; Zhang, Mueller, LW, & Conway, 2006; Caminal, Starfield, Sanchez, Casanova, & Morales, 2004; Politzer, Yoon, Shi, Hughest, Regan, & Gaston, 2001;Pappas, Hadden, Kozak, & Fisher, 1997; Billings, Anderson, & Newman, 1996; Bindman, Grumbach, Osmond,

Komaromy, Vranizan, Lurie, et al., 1995). Optimizing health outcomes is reliant on accessible care and provisions for standards of preventive care. Delivery of quality primary care is one of the most effective ways to reduce ACSC hospitalizations as studies have presented evidence that geographic areas with higher physician-population ratios have lower ACSC hospitalization rates (Parchman & Culler, 1994). Not all primary care physicians accept all patients, especially economically vulnerable patients, which presents a question of equitable access to primary care, and not just delivery of quality primary care.

In addition to equitable access, level of care is unequal across primary care practices due to physician time constraints in providing preventive care; whereas physicians may argue that it is difficult to take the time for preventive care when billing for it is not possible or when there are more pressing issues such as need for interventions for serious illnesses (Yarnall, Pollak, Ostbye, Krause, & Michener, 2003). Sustained continuity of care (SCOC) has been shown to decrease hospitalizations and has been consistently shown to improve quality of care for chronic disease patients (Cabana & Jee, 2004). If delivery of preventive care in a primary care setting were reasonably and consistently available to all people, the next step would be to ensure that people utilize preventive care, but this is not possible until reasonable access to care is ensured.

Populations with higher physician-to-population ratios have had lower rates of hospitalizations for ACSCs and emergency department visits for hypertension among men were less likely to have a primary care physician (Politzer, et al., 2001). A major shift in hospital discharges occurred in the early 1980s then began increasing in the later 1980s. The reason for the increase may be related to the Tax Equity and Fiscal

Responsibility Act (TEFRA) of 1982 that was implemented in 1983 (Shi & Singh, 2008) that changed hospital reimbursement to a prospective payment system. Congress and the administration realized that hospitals were not effective in reducing their costs and the intent of TEFRA was to control hospital spending. Diagnostic related groups (DRGs), a predetermined reimbursement system (or prospective payment system), for patient care based on a system of similar hospital resource use was implemented to control costs—payments were set per discharge based on diagnosis rather than per diem, which was based on length of stay (Shi & Singh, 2008). Later, states followed Medicare’s lead and used the same system for Medicaid. In a 1985 publication, two years following enactment of TEFRA, the rate of hospital costs were reported to have declined, mostly due to a decrease in the days of hospital care as opposed to a decline in costs per day of care. Additionally, hospital admissions, for people under age 65, declined sharply by 10%; however, the length of stay declined by only 7%; elderly patients’ average length of stay dropped by 15% from 10.4 days in 1981 to 8.8 by the end of 1984. Upon the enactment of TEFRA, declines in hospital admissions beginning in July 1983 were very rapid and hospital admissions for people older than 64 were increasing until the beginning of 1983, at which time they began decreasing (Davis, Anderson, Rowland, Schramm, Steinberg, et al., 1985). Further reducing hospitalizations should be possible if ambulatory care sensitive conditions were managed in a primary care setting that did not lead to (avoidable) hospital level care in a hospital setting.

Healthcare System Influence

Paradigms are shifting to patient-centered care that is evidence-based; that is, current with standards based on research. Additionally, continuity of care and follow-up

play essential roles in preserving optimal health. Historical models reflect physician-centered practices that operate in silos, and treatments typically derived from learning while in school do not provide up-to-date, evidence-based practices. In a case presented in the publication, “Crossing the Quality Chasm,” (Institute of Medicine: Committee on Quality of Health Care in America, 2001), Mrs. Martinez was diagnosed with later stage breast cancer due to a series of unfortunate events that would not have occurred if certain standards for information sharing, follow-up, and continuity of care had been followed.

In a study presenting issues around equity in health, societal influences on population health were presented in a model of health inequities due to environmental characteristics: wealth level and distribution, power/status relationships, behavioral and cultural characteristics, and health system characteristics. All are pathways that influence equity in health as indicated by Starfield (2006) who said that,

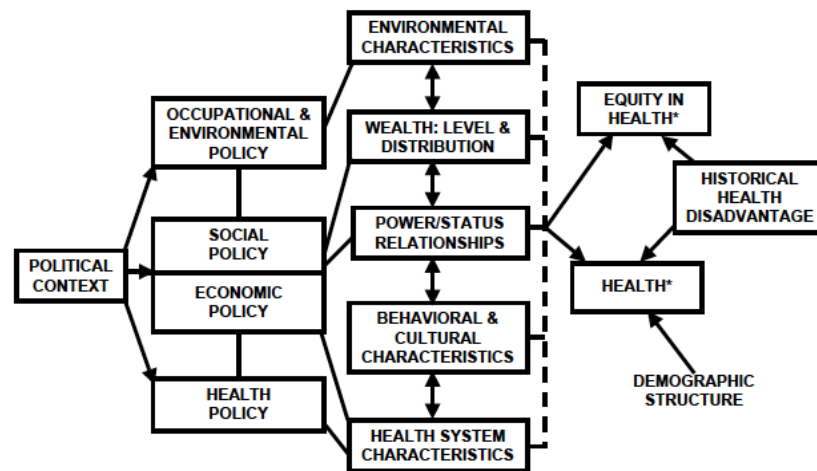
Health services preferentially affect severity (including mortality) of the complications of ill health. For the viewpoint of equity, effective health services directed at early detection and prevention of progression are more likely to have a considerable impact in reducing disparities in severity of illness, whereas interventions outside the health sector are likely to have relatively greater impact on the occurrence (incidence or prevalence) of illness. (p. 16).

Healthcare system barriers, therefore, influence the severity of illness by reducing or increasing the likelihood of utilization according to level of accessibility and affordability

of services (see Figure 1). Healthcare in the U.S. has historically been a system for treating illness, and preventing illness, like Starfield (2006) said, generally occurs outside the healthcare sector. Severity of illness is directly measurable by rates of ED use and hospital discharges for ACSCCs. If illnesses escalate to levels requiring hospitalization, healthcare access issues are indicated for study.

Figure 2

Societal Influences on Population Health



Note: Dashed lines indicate the existence of pathways through individual-level characteristics that most proximally influence health.

*“Health” has two aspects: occurrence (incidence) and intensity (severity).

Source: Starfield, B (2006). State of the Art in Research on Equity in Health. *Journal of Health Politics, Policy and Law*. Vol. 31, No. 1, February 2006. Duke University Press.

Addressing health system issues should include a widely accepted definition of equity in health defined as, “...the absence of systematic and potentially remediable differences in one or more aspects of health across socially, demographically, or geographically defined populations or population subgroups” (Starfield, 2006, p. 13). If

policy drives funding to support the health care system, then utilization is directly affected by the availability of services in that healthcare system, which may lead to outcomes that support future planning for appropriate services based on distribution, not just numbers of services. Ideally, improving availability of services would allow anyone to access primary/preventive care to avoid levels of care that cost more than the prevention (an ounce of prevention is worth a pound of cure); however, there will always be the trouble of balancing access with cost and quality.

The cost-quality-access triad (The Iron Triangle) is ever-present as a fundamental part of planning and decision-making for primary and/or preventive care; however, one or two elements will always be compromised upon the improvement of another. William Kissick said, “I can deliver any one of these three by compromising one or both of the other two” (Shaddox, 2005, p. 38). The reasoning behind Kissick’s statement relates to the need to improve costs, access, and quality, but when one is improved, there will always require a demand on another component that inevitably diminishes its influence. Ensuring access may require more facilities, but facilities cost money and ensuring the cost is recovered is problematic, especially where indigent people are concerned—a fundamental problem with FQHCs that should at best have a balanced blend of privately insured, Medicare/Medicaid, and self-pay patients. It may be that in vulnerable geographic areas, accessing primary care, even in an FQHC, may be much harder to come by. Reducing the severity of illness is dependent on an accessible healthcare system (Starfield’s model, Figure 1), but not so easily accomplished. If people are using the emergency department for primary care reasons, then this means that they are finding ways to accommodate their needs and bypassing primary/preventive care. It could be

that people delay care with the intention of getting back to the primary care doctor, or they simply know their financial limits and are unwilling to purchase preventive care.

Preventive care is far less expensive than hospitalizations for ACSCs, which are preventable using quality preventive care. Quality of care is a priority of federally qualified health centers, partially fulfilled by the provision of safe and effective care, which can only occur if it is accessible to the population in need. The provision of enabling services (transportation, translation) that represents equity, one of IOM's six aims, is also necessary to ensure the best health outcomes possible. Additionally, timely outpatient care, which is another aim (Institute of Medicine: Committee on Quality of Health Care in America, 2001) is critical to improving health outcomes, but also dependent on available and accessible services. The Donabedian Framework represents three components of the healthcare system, structure, process and outcomes; process, which is the interaction between patients and providers, and outcomes, which represent the effectiveness of care as well as costs for care. Structure is determined by federal and state regulatory agencies and can be inclusive of resources for delivery of health care, which care is delivered, and the facilities for delivery and all its requirements for care, procedures, and regulations (Ledlow & Coppola, 2011).

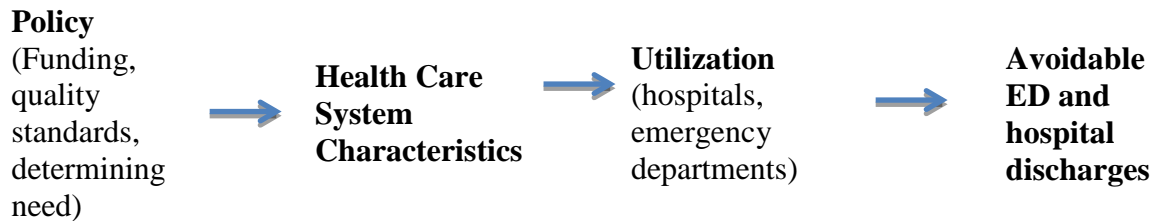
Structure can be measured by determining availability of appropriate resources that influence health outcomes related to accessing those resources, such as available and accessible primary care that adheres to certain standards for quality. Federally qualified health center (FQHCs) locations are guided by policies governing determination of need, and once in operation, FQHCs must adhere to specific standards, which ensure a level of quality primary care is met. Geographic accessibility is vital to receiving timely care.

Likewise, ability to pay for that care is necessary to access it. Section 330 regulations require that patients living within 100% of the federal poverty level, must pay at least a nominal charge for care, but they do not define what a nominal charge is; additionally, no Health Resources and Services Administration (HRSA) funds can be used to discount charges to anyone living over 200% of the federal poverty level (see Appendix A, Program Requirements). When the structure of the healthcare system is not meeting the needs of its patients, then patients may adapt their behavior to get their needs met, such as using emergency departments, one method used by many people to take care of their healthcare needs.

A pathway to hospital and emergency department discharges is illustrated in Figure 2 below, and extends Starfield's Model (Figure 1), depicting how health policy determines healthcare system characteristics, which then determine health equity. Then the Donabedian framework further extends the model to show how structure and outcomes are related, and in Figure 2, a pathway to ACSC discharges is depicted. First there is the policy that determines the characteristics of the health care system, followed by characteristics of the health care system derived by the policy, then patterns of utilization that occur in response to available services in the system, then health outcomes of the population such as ED and hospital discharges for ambulatory care sensitive conditions that may not be managed in a primary care facility. Low utilization for any reason can explain resulting ED and hospital discharges that are avoidable.

Figure 3

Pathway to Avoidable Emergency Department and Hospital Discharges



The Emergency Department as a Primary Care Alternative

Emergency departments have been used as a safety net for conditions that should be addressed in a primary care setting. The Emergency Medical Treatment and Active Labor Act (EMTALA) was enacted in 1986 to address the issue of “patient dumping,” which occurred when poor or uninsured patients in need of emergent treatment were transferred to another hospital based on their inability to pay for care. To address this problem, laws were enacted by states, but this approach was considered ineffective due to continued difficulty of patients in receiving care. As a response to continued problems, hospitals were then required to provide care without regard to ability to pay, but there continued to be problems due to debate about which conditions constituted an emergency. Through a series of weak support systems and laws for the statute, ensuring care by EDs was not successful (Lee, 2004). Essentially, EMTALA requires hospitals receiving federal Medicare funding to have provisions for medical screening examination to anyone and must extend to all patients regardless of their insurance status. Hospitals may not delay initial medical screening to inquire about insurance, and if the person is diagnosed with a medical emergency condition, the hospital must first stabilize the

patient's condition before transferring to another hospital (Lee, 2004), and patients must be admitted to the hospital, if necessary (Shi & Singh, 2008).

Statistics indicate unmanageable growth in ED use over the last 23 years. From 1988 to 1998, 1,128 EDs closed while visits to EDs rose 17% during the same period and ED visits rose from 97 million in 1997 to 114 million in 2003 (Dietrich, 2008). Many ED visits could have been managed in non-emergency clinics for conditions such as upper respiratory infections, musculoskeletal conditions, skins conditions, and other non-specific conditions; and of these ED visits 3.8% of 31,197 ED visits were categorized as preventive care in one study (Weinick, Burns, & Mehrotra, 2010). Emergency department (ED) use is also an indicator of lack of continuity of care with a single provider and increases in ED use were inversely associated with provider use for primary/preventive care (Gill, Mainous, & Nsereko, 2000). In a cross-sectional study of Medicaid claims in 1993, continuity of provider care was analyzed to determine the likelihood of ED visits. Gill, Mainous, and Nsereko (2000) found that lower ED use is predicted from higher provider use. The use of EDs for conditions that could be treated in the physician's office is congruent with other ACSCC studies. Distance and costs related to primary care access were not examined in the Gill, et al., (2000) study, however.

ED visit rates increased from 1997 to 2007, which may mean that EDs were being used as primary care venues for underserved populations, as trends in ACSCs clearly showed increases over this ten-year period as well, especially among Medicaid beneficiaries (Tang, Stein, Hsia, Maselli, & Gonzales, 2010). The ED is a cost prohibitive means for managing certain conditions that if left untreated, can result in

hospitalizations. Overcrowded emergency departments (EDs) are made up primarily of poor, non-White populations who have little to no access to a regular source of care (Grumbach, Vranizan, & Bindman, 1997). Lack of consistent primary care, which is intended to manage conditions before they escalate, often leads to ED use because patients use the ED as a safety-net. In spite of the suggestion that it would be difficult to continue reducing hospitalizations (Bernstein, et al., 2003), there may still be opportunities to do so given conditions that can lead to hospitalizations that are avoidable.

Facilitators of Delayed Primary Care

An ACSC that results in a hospitalization may also be an indicator of the quality of primary care when early treatment with antibiotics, pharmaceuticals, or patient education, could have prevented an outcome requiring hospitalization (Laditka, Laditka, & Probst, 2009). Hospitalization for an ACSCC is also an indicator that care was not consistent in the six months prior to the ACSC hospitalization, as stated that, "...diseases for which primary care in the preceding six months could have reduced or eliminated the need for hospitalization, are a commonly used indicator of disparities in access to care" (Probst, Moore, Baxley, & Lammie, 2003, p. ii). Continuity of care (seeing the same physician at each visit) and accessibility are domains of primary care that mediate the effects of low income, especially among health centers because they provide a regular source of care. A widely available and accessible primary care system is consistent with better health status indicators (Politzer, Yoon, Shi, Hughest, Regan, & Gaston, 2001). The term, "widely available" implies widely distributed sources for equitable access to

care, not just availability of private primary care physicians, where access is not guaranteed to everyone on the basis of unaffordability or very limited clinic hours.

Sociodemographic

People of low socioeconomic status, those who are uninsured, those living in poverty, and Medicaid patients have a history of higher ACSC hospitalizations than those with higher incomes (Billings, Zeitel, Lukomnik, Carey, Blank, et al., 1993). Accessing consistent high quality preventive care can be difficult for those without insurance, or with Medicaid due to limits on the number of Medicaid patients a physician can, or will, accept. In a study of Maryland and Massachusetts residents, Medicaid patients were more likely to be hospitalized for avoidable reasons than privately insured patients (Weissman, Gatsonis, & Epstein, 1992). In a Canadian study, socially disadvantaged people who lived in wealthier areas were in better health than socially disadvantaged people living in poorer areas (Hou & Myles, 2004). The authors stated that individual living standards did mediate inequality, the reasons for which were not well known, but were tested to determine if less affluent people experienced better health due to benefitting from services available in wealthier areas, or due to competition for resources with wealthier people (Hou & Myles, 2004). Although there were no significant associations found between better health among lower income people living in higher income areas, the authors were inclined to believe that because more affluent neighborhoods enjoyed zoning and housing strategies that encourage economically elevated areas, those living with lower incomes could also benefit if they shared the same neighborhoods (Hou & Myles, 2004). Hospitalization rates were examined for selected ACSCs to determine effectiveness of primary care in small geographic areas to assess

whether ACSC rates were sensitive to local primary care system resources. There was a high correlation between rates of income, but not for primary care resources and the distribution was aligned with assessments of poor access to health services in the area, meaning that availability of primary care resources correlated with lower rates of ACSC admissions (Ricketts, Randolph, Howard, Pathman, & Carey, 2007). Age, gender, race, ethnicity, education, and healthcare seeking behavior have been shown to relate to ACSCC hospital rates for acute, avoidable, and chronic conditions combined, in urban areas (Ricketts, Randolph, Howard, Pathman, & Carey, 2007). These studies have demonstrated associations between ACSC admissions and income, higher rurality, and urbanicity; however, they have not focused solely on chronic disease outcomes, which are reliant on a regular source of primary care to reduce poor outcomes. Access to primary care that ensures services for all people is the only way to guarantee that people can utilize the care. Once assurance of access to primary care is met, then individual behavior towards appropriate utilization of primary care can be addressed without regard to ability to pay or unavailability of high quality primary care.

Rural/Urban

Level of rurality from eight states with the highest ACSC hospitalization rates was found to be positively associated with higher rates of ACSCs among adults 18-64 years old (Laditka, Laditka, & Probst, 2009). There was no distinction between acute and chronic illness as an ACSC cause for hospitalization in this study, however. An increase in physician supply in rural areas was suggested as a point of policy change (Laditka J. , 2004) and, as cited in another article, differences in quality of care may have confounded similar results due to fee-for-service vs. managed care differences in preventive care,

which determine what services were provided (Laditka, Laditka, & Probst, 2009). In another study, researchers compared uninsured emergency department visit rates among Georgia's rural counties, with and without community health centers, found uninsured residents in rural counties without a community health center had rates of ED visits that were 33% higher for all causes than those with insurance (Rust, Baltrus, Jiali, Daniels, Quarshie, et al., 2009).

Supply Factors

In a South Carolina study of selected sociodemographic characteristics of nonwhite, low-income individuals in more rural areas, ACSCs were higher among those without a primary care physician, and the average ACSC hospital charge was 12% more for adults than the average charge overall for the same conditions among those with primary care physicians (Shi, Samuels, Pease, Bailey, & Corley, 1999). Bindman et al. (1995) determined that people from communities who perceived poor access to healthcare tended to have higher chronic disease rates and hospitalizations due to the likelihood that poorer access changed individual healthcare seeking behavior. In a national survey, adults in the U.S. who had a primary care physician also had lower mortality rates than those reporting having a specialist as a regular source of care (Starfield, Shi, & Macinko, 2005). The impact of primary care on health is measurable by comparing those with and without access to a primary care physician because specialist care did not reduce mortality when compared to primary care. The fact that there are fewer physicians in rural areas in all U.S. regions (Gamm, Castillo, & Pittman, n.d.) suggests access problems, but supply factors coupled with spatial factors, complicates the primary care access issue further.

Ambulatory care sensitive care hospitalization (ACSCH) rates are used as indicators of primary care effectiveness, insurance coverage, and economic conditions in primary care markets, but not primary care resources (Ricketts, Randolph, Howard, Pathman, & Carey, 2001). Lower income populations have historically been less likely to utilize primary care regularly, more likely to have delays in care, and less likely to receive preventive care (Pappas, Hadden, Kozak, & Fisher, 1997). A positive association was found between people living within 200% of poverty, being Black, and number of primary care providers per 1,000 people in terms of ACSC admissions; furthermore, proximity to hospitals was positively associated with ACSC admissions that were only studied in the most rural zip code groups (Schreiber & Zielinski, 2007). Overcoming barriers to quality primary care is a critical step in reducing poor health outcomes.

Assuring high quality primary care access has been the focus of the Department of Health and Human Services for forty years to reduce disparities related to inability to access (for any reason) consistent primary care (U.S. Department of Health and Human Services, 2011). One solution to the primary care access issue is the federal safety net initiative to increase access, one of which is the placement of FQHCs that ensure primary care that varies according to income. Research has demonstrated that FQHCs have a positive impact on health outcomes.

Federally Qualified Health Centers (FQHCs): A Primary Care Safety Net

Provisions for primary care are assured by the U.S. Department of Health and Human Services, Health Resources and Services Administration through the Federally Qualified Health Center Program for primary care, sometimes referred to as “community health centers.” FQHCs must provide essential services of all primary, preventive, and

enabling health services, which include education and translation services (U.S. Department of Health and Human Services, 2011). Appendix A outlines more specifically the details in adhering to FQHC requirements.

Lower admission rates for ACSCs may reflect the use of primary care either before a condition escalates to the need for hospitalization or, perhaps, that hospitalizations are avoided when primary care access can be assured. For instance, if a patient visits the ED for a chronic condition and the ED doctor cannot be assured that the patient would have reasonable access to a primary care provider within a given time frame, it may be in the best interest of the patient to be admitted to the hospital. This point was discussed in a study where patients were surveyed about being hospitalized. The study focused on selected chronic diseases to determine associations between patient reported access issues, health care seeking behavior, and physician practice style, where physician practice style may have indicated a need for admission due to lack of assurance that the patient could reasonably access clinic care (Bindman, et al., 1995). Gaps in quality primary care have been problematic for the most vulnerable populations, but the use of FQHCs to address these gaps, especially under the Medicaid budget cuts, may be the only way to address the needs facing the U.S. (Shi, Stevens, & Politzer, 2007). Standards of care that address reduction in severe levels of illness have been shown to reduce ACSC hospitalizations (Poltzer, et al., 2001). The use of FQHCs ensures that all people have access to primary care regardless of insurance coverage, and FQHCs are prevention focused, which ensures efforts to reduce poor health outcomes. Uninsured adults were more likely to receive education/counseling about diet, exercise, tobacco use, alcohol use, and sexually transmitted diseases when they received care from

FQHCs, unlike uninsured adults who received care from non-FQHC providers. These patients were also 16% more likely to have visits for ACSC-conditions, which resulted in cost reductions of 30-34% among Medicaid patients Medicaid recipients were 22% less likely to have an ACSC hospitalization when they sought care at an FQHC compared to those who sought healthcare elsewhere (Politzer, et al., 2001). FQHCs are required to adhere to strict standards for quality primary care delivery; whereas, private primary care practices have not been required to have the same standards, or to report outcomes. Users rated their FQHCs higher than health maintenance organization (HMO) users, with the exception of ease of first contact (Shi, Starfield, Xu, Politzer, & Regan, 2003). FQHCs not only provide standards of primary care practice quality, but they also guarantee access for anybody regardless of ability to pay; however, patients may not avoid payment of even nominal amounts, indefinitely. The subject of co-pays is discussed later.

In a study of healthcare utilization behavior, insurance coverage, scope of benefits, socioeconomic status, community resources, health status and comorbidity were examined to determine if “high use” (use of primary care preventative services at least 75% of the time) predicted reduced ACSC hospital admissions. In two Southern states (Georgia and Alabama), ACSC hospital admissions and emergency department visits were highest; however, ACSC admissions were lower where there were accessible Federally Qualified Health Centers (FQHCs) (Falik, et al., 2005). FQHCs met or exceeded standards for treatment of hypertension, diabetes, and asthma and of Hispanic and African-American patients of FQHCs, 90% reported blood pressures were under control, which was higher than patient populations of non-FQHC patients (Politzer, et al., 2001). The use of FQHCs by uninsured and other vulnerable populations may be critical

in reducing ACSC hospitalizations for chronic conditions. Even when primary health care is available by means of insurance coverage, Medicare and Medicaid accessibility may still be problematic due to system related barriers such as providers who do not accept Medicare or Medicaid, or have reduced the proportion of their patient base covered by Medicare and Medicaid. Private practices are not expected to operate with ratios of Medicaid and Medicare patients that are too high to maintain a financially viable practice, which is generally the basis for limitations on accepting unlimited Medicare and Medicaid patients.

Primary care quality may vary from the level of care guaranteed by FQHCs because the requirements by their funding sources (the federal government) guarantee that certain prevention standards must be met in order to continue receiving funding. Quality standards must be maintained and evidence must be well documented to ensure continued funding by individual FQHCs.

FQHC Determination of Need

Determining the location of FQHCs is based on designation systems to qualify FQHC applicants. Medically underserved areas (MUAs) and health professional shortage areas (HPSAs) are designations for determining the location for an FQHC under the federal safety net initiative. The U.S. General Accounting Office (GAO) determined, however, that the HPSA and MUA systems for determining underserved areas was inconsistent and flawed as stakeholders also stated that this system seemed arbitrary (Ricketts, Randolph, Howard, Pathman, & Carey, 2007), which indicates clearly that leaders are reassessing how need is determined. Based on a history of debates about underserved designations, new guidelines were scheduled for publication following a 6-

month review and comment period. This new scheme required five elements of simplicity, science, face validity, retention of designations for places with safety net providers and acceptable performance, and all factors thought to be lacking in previous definitions of underservice (Ricketts, Randolph, Howard, Pathman, & Carey, 2007). The system for designating FQHC locations is based on an index of underservice as defined by an adjusted population to practitioner ratio and total score of demographic variables. Percent non-White, percent Hispanic, percent population >65 years, economic (percent population living <200% of federal poverty limits, unemployment rate), and health status (actual/expected death rate [adjusted], low birth weight rate, and infant mortality rate) were elements of the calculation. An impact analysis study was done to determine differences from baseline that would occur under the new underservice scheme. The results showed lower numbers of federal safety net areas than with prior methods for determination, and according to the authors, this new method was complex, breaking one of the original principles for a new method, which was simplicity for FQHC determination of location. Finally, as Ricketts, et al (2007) stated,

Where a program is absent, clinicians who might not see patients for preventive care are often called on to care for them in emergency conditions when complications have arisen because the patient did not seek care earlier. The amount of the increase in use brought about by delayed care must be added into the reduction in use to produce an accurate estimate of the entire access problem in a community.” (p. 586).

There was no element in the equation that would account for delayed care, which the study argued would increase use of services. It is difficult to know where services are needed if there is no accountability for delayed care brought on by access barriers. Access barriers are difficult to overcome due to a lack of knowledge about whether safety net facilities were servicing low-income populations in the area of designation, or whether there was boundary crossing, according to Ricketts et al. (2007).

Barriers to FQHC Utilization

a) Cost and Copay Barriers

Research has indicated that even the copay may be a barrier to utilization preventive/primary care. The “California copayment experiment” implemented a \$1 copay on Medicaid beneficiaries for the first two doctor visits per year in 1972, which resulted in a decrease in ambulatory doctor’s office visits as compared to a non-copayment cohort (Roemer, Hopkins, Carr, & Gartside, 1975). Over a period of one year, quarterly rates were compared between copay and non-copay groups and the copay cohort visited ambulatory care clinics less than the non-copay cohort throughout the duration of the copay experiment. The authors of this study discussed the short-term benefits of copays for Medicaid due to lower expenditures from a reduction in medical claims; however, concerns were highlighted that relate to medical outcomes resulting from this change. For example, if patients delay care due to the copay, demands for care later may prove more expensive due to the progression of a neglected condition that may require more intensive treatment than would have been the case if the patient sought care earlier. Although FQHCs do provide care using copays on sliding fee schedule according

to income, the cost may deter FQHC patients from seeking care earlier in an illness state; likewise, patients may defer preventive care completely. Although costs and co-pays are not studied in this current research, it is worth noting that even a nominal co-pay may be cost-prohibitive to some users of FQHCs.

b) Geographic Barriers

Federally Qualified Health Centers (FQHCs) enhance primary care access in terms of barriers due to cost, but there are other potential barriers to accessing care. Geographic distribution is a system-related barrier that may act as a barrier due to distance and travel time as impediments to accessing primary care in any setting, but especially FQHCs, which are only placed in medically underserved areas (MUAs) or health professional shortage areas (HPSAs). MUA designations are determined by an index score derived from infant mortality rates, percent of service area's population living within poverty, percent of population 65 or older, and current full-time equivalents of primary care physicians providing patient care in the service area (U.S. Department of Health and Human Services: Health Resources and Services Administration, 1995). Likewise, HPSA designations are determined by shortage of primary medical care, dental or mental health providers and they may be urban or rural areas or population groups or medical or other public facilities (U.S. Department of Health and Human Services, Health Resources and Services Administration, n.d.). The designation of the MUA or HPSA is the determining factor for where an FQHC will be located; however, this may not address the realistic accessibility issues that occur every day. Policies that drive the

location(s) of FQHCs may need to be revisited to determine where primary and perhaps secondary locations might be located, to optimize access across service areas.

i) Potential and Realized Healthcare Access

Healthcare utilization is reliant on individual level behavior, but system related accessibility issues must be assured before individual utilization behavior can be addressed. Accessibility issues owing to transportation, waiting time, and physician supply have been suggested as barriers to timely primary care (Laditka, Laditka, & Probst, 2009), and health system characteristics, as they relate to geography and availability derived from health policy (see Figures 1 and 2) present an area for change to improve chronic disease outcomes.

Low socioeconomic status (SES) neighborhoods were studied in Canada to determine reasons for excess hospitalizations in this group. When the effects of low SES were removed, the authors found that lower SES groups had more difficulties keeping scheduled appointments because of transportation barriers or inability to take time off work or find childcare (Booth & Hux, 2003). In another Canadian study, wait times and geographic inaccessibility were shown to reduce utilization of primary care, as reported by survey respondents stating that leaving work to wait for a doctor for extended periods also reduces time spent at work (Wellstood, Wilson, & Eyles, 2006). For employees earning hourly wages in the U.S., travel time and wait time would likely discourage accessing primary care during the workday. Women, in the same study, also described family responsibilities that influence accessing care because they often need to bring their children with them and keep them entertained while at the doctor's office. Traditional day

time clinic hours and unpredictable waiting times can diminish the perceived need for primary care (Wellstood, et al., 2006). These findings related to healthcare utilization represent what people actually do rather than what they theoretically could do to access primary care. Multiple factors weigh in to the ability to access care without disrupting other areas of their lives to a point that outweighs perceived need for regular care. In other words, people should access care if it is reasonable to do so, but if they perceive that the barriers are too great, the need for care may be diminished in light of the barriers.

In 1980, a schematic model of healthcare access was developed by LuAnn Aday that presented a conceptual view for improving healthcare access based on health care planning and policy and characteristics of the system, the users, and factors that mediate access (Khan & Bhardwaj, 1994). This model was used to explain barriers and facilitators to access that are not determined only by users, but also by political factors and enablers of access. The Aday (1980) model was the basis for dichotomies presented by Khan and Bhardwaj (1994), which emphasized spatial and non-spatial factors that determine the level of acceptable access, if in fact, services are available. Spatial factors were defined as geographic access and distance, and aspatial factors were defined as, “...social access of individuals or communities is that which is conditioned by nongeographic barriers or facilitators (e.g., economic, social, cultural, or political), but it may also have a geographic expression, thus revealing a spatial pattern of (social) access.” (Khan & Bhardwaj, 1994, p. 68). In Aday’s model (1980) there were two types of access termed “potential” or “realized” that play a role: potential access is the availability of healthcare and realized access relates to the utilization of healthcare to meet healthcare needs. A typology of access was presented that differentiated between

four dichotomies: (1) potential spatial access opportunity – potential spatial access cost; (2) potential social access opportunity – potential social access cost; (3) realized spatial access opportunity – realized spatial access cost; and (4) realized social access opportunity – realized social access cost that allow for focus on specific areas of research or planning. Access, in the Khan and Bhardwaj (1994) typology, is dependent on availability, which provides an opportunity to access healthcare, but it also is dependent on factors that are mediated by social (time, cost, cultural, economic, or political) and spatial (geographic/distance) access costs.

Utilizing potential spatial access as an indicator for primary care delivery is a measureable indicator for healthcare access, and a may be a contributing factor for ambulatory care chronic condition (ACSCCs) hospital and ED discharges for ACSCCs. If healthcare services are available that meet the needs of the service area population in terms of spatial accessibility and social accessibility, ACSCC rates should be reduced, or at the least, not increase over time. As presented in the introduction, ACSCC hospital rates have increased over the last 10 years in Georgia, which could be mitigated by provisions for potential access coupled with realized access. The study of ACSCC hospital and ED discharge rates before and after new and accessible primary care additions may provide decision makers with useful information towards planning for primary care access via FQHCs.

ii) Spatial Factors Affecting Utilization of Primary Care

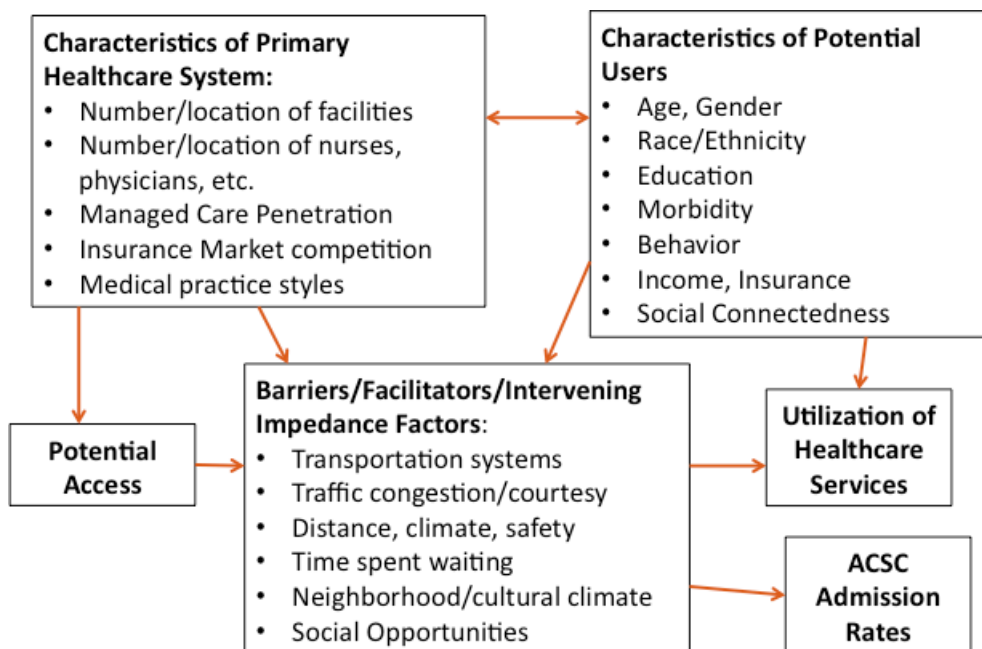
The theoretical framework developed by Khan and Bhardwaj (1994) conceptualized potential access to healthcare, depicting potential access as the

availability of resources relative to service needs, and realized access as the use of available resources to satisfy healthcare needs, along with other sociodemographic factors. Later, a spatial model of utilization (Figure 2) was developed by Mobley et al (2006) that included potential and realized access, but in a “spatial interactions” model demonstrating the barriers, facilitators, and intervention impedance factors that affect access. This spatial model was used to study ACSC hospital admissions among the elderly population by primary care service area (PCSA) markets. The model utilized demand factors, supply factors, and intervening factors. The demand factors related to social and economic conditions that affect poverty, and in the Mobley et al (2006) study, poverty was particularly problematic among elderly living in rural areas when compared to urban areas. Poverty, a demand factor was impeded by access limitations due to relative isolation. Supply factors were related to the availability of physicians, noting that in higher income areas there were more physicians and lower mortality rates. In spite of policies to incentivize physicians to practice in rural areas, there are still maldistribution problems, and this of course, affects supply. However, non-physician clinicians in healthcare supply such as nurse practitioners and physician assistants are included in supply counts now, which resulted in improvements in rural supply based on a 2000-2001 Community Tracking Survey (Mobley, et al., 2006). Intervening factors are the last of the three elements that affect access in this model (Figure 4). Across the rural-urban continuum, people in remote rural areas had longer travel times to seek healthcare even though people in rural areas were significantly less likely to say they could not get an appointment than suburban and metropolitan areas (Mobley, et al, 2006). In addition, the study considered workforce who travel more than 60 minutes to work as a factor that

interfered with elderly people traveling to their appointments as urban sprawl affected roadways by congesting them and making it difficult for elderly to drive to their appointments. The study also reviewed other intervening factors such as managed care coverage that affected the preventive services offered, meaning that consistency could not be assured from one coverage type to another. The framework in Figure 4 summarizes characteristics of the healthcare system, its relation to access, users and factors that affect utilization.

Figure 4

Spatial Model of the Utilization of Healthcare Services



Source: Mobley, Root, Anselin, Lazano-Gracia, & Koschinsky, 2006, p. 4 of 7

Some of the characteristics of potential users presented in the model (Figure 4) could be cumbersome to measure on a large scale, with the exception of age, gender,

race/ethnicity, education, income and insurance coverage. Behavior and social connectedness relate to how people influence one another in terms of modeling behaviors/peer effects of healthcare utilization. Barriers and facilitators to accessing healthcare, variations in availability of public transportation and traffic congestion issues differ by geographic area according rural and urban status.

Time and distance for travel to and from FQHCs may affect hospital discharge and ED discharge rates for ACSCCs. Distance decay describes the effect of distance on cultural or spatial interactions because as distance between two locales increases, the interaction between those locales' declines (Wang & Wei, 2005). The Department of Health and Human Services designates health shortage areas, but these are determined by non-spatial factors of age and socioeconomic status and are administratively defined areas, which is a criticism of current methods for determining health care needs (Luo, 2004). Reasonable accessibility to healthcare, as defined by Lou, is travel time within 20 minutes on primary roads and within 30 minutes on secondary roads. Distance decay, potential access and realized access, may be intimately linked in determining the likelihood of accessing primary care in an FQHC. Travel time greater than 30 minutes is one more factor that could reduce the likelihood of accessing primary care. Varying levels of severity of illness may be a heavily weighted factor, in combination with travel time and other barriers that determine whether a patient is going to seek primary care, or "wait and see," which can lead to ED use and /or hospitalizations for chronic conditions.

The purpose of this study was to determine if there were county variations of hospital and emergency department discharges following the addition of FQHCs during the period 2002 to 2008. Other factors of age, gender, race, and payer type were included

in the study to determine possible associations. Additionally, travel time >30 minutes from FQHCs in Georgia were geographically assessed to assess potential gaps in FQHC access.

CHAPTER 2

RESEARCH QUESTIONS AND HYPOTHESES

In developing the research questions for this study, it was clear that certain elements relating to ACSC hospital and ED discharges needed clarification as they relate to potential access problems in Georgia, and the possibility that poor access could be contributing to poorer health outcomes. As ACSCs are known to indicate where health disparities exist and where low access and/or utilization to quality primary care occurs (Bindman, et al., 1995; Laditka, Laditka, Probst, 2009), it seemed logical to ask where FQHCs were located, when they were added to specific geographic areas, and to compare rates of hospital and ED discharges as health outcomes before and after FQHC additions. Additionally, typical variables of gender, age, race, and payer type are reflected in the research questions because of their potential influence on health outcomes.

Research Questions

Research Question #1: Do per capita hospital discharges for ambulatory care sensitive chronic conditions (ACSCCs) vary with the addition of federally qualified health centers (FQHCs) in Georgia counties during the period 2002 to 2008, controlling for age?

Research Question #2: Do per capita discharges from the emergency department (ED) for ACSCCs vary with additions of FQHCs in Georgia counties during the period 2002 to 2008, controlling for age?

Research Question #3: Do per capita hospital discharges for ACSCCs vary with FQHC additions in Georgia counties during the period 2002 to 2008, controlling for gender?

Research Question #4: Do per capita discharges from the ED for ACSCCs vary with FQHC additions in Georgia counties during the period 2002 to 2008, controlling for gender?

Research Question #5: Do per capita hospital discharges for ACSCCs vary with FQHC additions in Georgia counties during the period 2002 to 2008, controlling for race?

Research Question #6: Do per capita discharges from the ED for ACSCCs vary with FQHC additions in Georgia counties during the period 2002 to 2008, controlling for race?

Research Question #7: Do per capita hospital discharges for ACSCCs vary with FQHC additions in Georgia counties during the period 2002 to 2008 payer type?

Research Question #8: Do per capita discharges from the ED for ACSCCs vary with FQHC additions in Georgia counties during the period 2002 to 2008 payer type?

Research Question #9: Are there areas of Georgia where access to FQHCs was not within a reasonable drive time of 30 minutes during the 2002 to 2008 period?

Hypotheses

Null Hypothesis 1: No differences exist in per capita ACSCC hospital discharges in Georgia counties with the addition of FQHCs.

Null Hypothesis 2: No differences exist in per capita ACSCC ED discharges in Georgia counties with the addition of FQHCs.

Null Hypothesis 3: No differences exist in per capita ACSCC hospital discharges in Georgia counties with the addition of FQHCs from 2002 to 2008.

Null Hypothesis 4: No differences exist in per capita ACSCC ED discharges in Georgia counties by race with the addition of FQHCs from 2002 to 2008.

Null Hypothesis 5: No differences exist in per capita ACSCC hospital discharges in Georgia counties by race with the addition of FQHCs from 2002 to 2008, controlling for age.

Null Hypothesis 6: No differences exist in per capita ACSCC ED discharges in Georgia counties by race with the addition of FQHCs from 2002 to 2008, controlling for age.

Null Hypothesis 7: No differences exist in per capita ACSCC hospital discharges by payer type with FQHC additions in Georgia counties by gender during the period 2002 to 2008, controlling for gender.

Null Hypothesis 8: No differences exist in per capita ACSCC ED discharges by gender with FQHC additions in Georgia counties by gender during the period 2002 to 2008, controlling for gender.

Null Hypothesis 9: No differences exist in per capita ACSCC hospital discharges by age-group with FQHC additions in Georgia counties during the period 2002 to 2008, controlling for race.

Null Hypothesis 10: No differences exist in per capita ACSCC ED discharges by age-group with FQHC additions in Georgia counties during the period 2002 to 2008, controlling for race.

Null Hypothesis 11: No differences exist in per capita ACSCC hospital discharges by payer type with FQHC additions in Georgia counties during the period 2002 to 2008, controlling for payer type.

Null Hypothesis 12: No differences exist in per capita ACSCC ED discharges by payer type with FQHC additions in Georgia counties during the period 2002 to 2008, controlling for payer type.

CHAPTER 3

METHODS

Data

Secondary data were used in this study to determine if hospital and emergency department discharges for ambulatory care sensitive chronic conditions (ACSCCs) varied during the period from 2002 to 2008, following the additions of FQHCs in Georgia counties. Hospital discharge data were retrieved from the State of Georgia Department of Community Health (DCH), through the Division of Public Health (DPH), Office of Health Indicators for Planning (OHIP), which maintains morbidity databases for years dating from 1999. ED data were also retrieved from the same state office, but only for years 2002 to 2008. Both databases were delivered in spreadsheets, both in tabulation and pivot table formats.

Publically available population data by age, gender, race, and payer type were collected from an online site provided by DCH, DPH, OHIP for the years 2002 to 2008. All U.S. Federally qualified health center (FQHC) locations were retrieved in a spreadsheet from Department of Health and Human Services (DHHS), Health Resources and Services Administration (HRSA) Data Warehouse web site and no permission was required. This file is refreshed daily and made available to the public. The date of retrieval of data for this study was November 16, 2011.

Variables

Figure 5

Map of Georgia Counties



The variables selected for this study included all ambulatory care sensitive chronic conditions (ACSCCs), described in Table 1, derived from a standard definition used by the State of Georgia. Georgia is located in the Southeastern region of the United States and has 159 counties, the basis for FQHC service areas. Of the 159 counties, 108 have rural designations. The remaining 51 counties were non-rural counties. There were 135 FQHC access points with services to 77 counties as of December 2011, in Georgia, according to the Georgia Department of Community Health, State Office of Rural Health.

For the purpose of this study, hospital and emergency department discharges for ACSCCs were used as indicators of adequate primary care access. Optimal use of

primary care should prevent hospitalizations and emergency department use for conditions that could be managed in a primary care setting, avoiding resulting high cost care. Federally qualified health centers were used in this study to determine their influence on ACSCC outcomes since FQHCs provide primary care to anyone with fees based on income. Other similar primary care services were available in Georgia counties; however, no other clinics or private practices guarantee access to primary care services for everyone. Summaries of study variables, their definitions, and variable types are presented in Table 1.

Table 1

Study Variables, Definitions, and Variable Type

Study Variable	Definition	Variable Type
Ambulatory Care Sensitive Chronic Conditions (ACSCCs) <i>All ACSCCs are reported for the patient’s county of residence whether or not an ED encounter or hospital discharge took place in the county of residence.</i>	Angina (ICD-9 411.1, 411.8, 413) Asthma (ICD-9 493) Chronic Obstructive Pulmonary Disease (ICD-9 466.0, 491, 492, 494, 496) Congestive Heart Failure (ICD-9 402.01, 402.0, 402.1, 402.9) Diabetes with ketoacidosis or hyperosmolar coma or other coma (ICD-9 250.1 – 250.33) Diabetes with other specified or unspecified complications (ICD-9 250.8 – 250.93) Diabetes mellitus without mention of complications or unspecified hypoglycemia (ICD-9 250 – 250.04) Grand Mal & Other Epileptic Conditions (ICD-9 345) Hypertension (ICD-9 401.0, 401.9, 402.0, 402.1, 402.9) Tuberculosis, non-pulmonary (ICD-9 012-018) Tuberculosis, pulmonary (ICD-9 011)	Dependent
Race	White, Black, Other (Asian, American Indian, Alaskan Native, Native Hawaiian, Pacific Islander, multiracial).	Control
Gender	Male, female	Control
Age	Adult ages 18-44 and 45-64	Control
Payer Type	The type of payment used to purchase healthcare: Medicare, Medicaid, Private insurance, self-pay, PeachCare (S-CHIP)	Control
Federally Qualified Health Center (FQHC), also known as “health center”	A type of provider defined by the Medicare and Medicaid statutes. FQHCs include all organizations receiving grants under Section 330 of the Public Health Service Act, certain tribal organizations, and FQHC Look-Alikes. Location by county (as present or not present)	Independent

Procedures

Data Collection

All data analyzed in this study were from secondary sources and provided by institutions as indicated earlier. Hospital and ED discharges for ambulatory care sensitive chronic conditions, by county of residence, were provided with permission by the Georgia Department of Community Health, Division of Public Health, Office for Health Indicators for Planning (GADCH, DPH, OHIP). Institutional Review Board approval was attained on 12/19/2011 and renewed on 3/21/2012.

The FQHC database, retrieved from the Department of Health and Human Services (DHHS), Health Resources and Services Administration (HRSA) Data Warehouse, web site was titled “Healthcare Centers and Lookalikes”. It included many variables related to FQHC locations, the grantee account number and multiple other variables not pertinent to this study. For the purpose of this study, only the FQHC name, street address, city, county, state zip code, site open date, service delivery type, health center location type, operating schedule, and organization description were used. A description of FQHC variables is presented in Table 2.

Table 2

Federally Qualified Health Center Variable Definitions

Health Center Variable	Definition*
Center Name, street address, city, county, state, and Zip + 4	Grantee name and name of FQHC (“center”), the street address of the service delivery site, the city, county, state, and zip code
Service Delivery Type	Correctional facility, domestic violence shelter hospital, nursing home, tribal, unknown, and all other clinic sites
Location Type	Seasonal, mobile van, intermittent, permanent
Operating Schedule Type	Full-time and Part-time
Organization Description	Administrative site, service delivery site, administrative and service delivery site
* Bold type text represents elements used in this study	

See Appendix A for an extensive FQHC definition. There were no identifiers in the databases that would enable tracing cases to individuals.

Hospital discharge and Emergency Department Data

The ACSCC database, as delivered, had 858,698 cases of hospital discharges reported. Exclusion criteria were based on ages outside the groups under study, unknown diagnoses, acute and avoidable conditions, and event years outside the study period. Ages <1 to 17 years (n=116,339) and ≥ 65 years (n=239,844) were excluded for a total of 356,183 excluded cases. Acute conditions (n=224,000), avoidable conditions (n=50,862), and unknown conditions (n=54,087) and years outside the period of study (n=50,399) were excluded. The final count for all inclusions was 123,167 for discharges during the years 2002 to 2008 by county, race, gender, ages 18-64 and payer type in Georgia. The same exclusion criteria were applied to the emergency department (ED) database of 305,985 cases. For the age criterion, <1 to 17 years (n=39,653) and ≥ 65 years (n=65,647) a total of 105,300 cases were removed. There were no acute or avoidable conditions included in the ED original database. The ED database final count was 200,685. There were no identifiers in the database that would enable tracing cases to individuals. See Appendix B for a copy of the State of Georgia data use form.

Federally Qualified Health Center Location Data

The FQHC database was cleaned to remove clinic locations that were added after the year 2008, outside the period under study. Additionally, sites were not used that were not intended for public use such as those sites found in correctional facilities and nursing homes. There are also domestic violence shelter FQHC locations by definition, but none were noted in Georgia. Finally, all locations were removed that were not designated

service delivery sites. Some were strictly service delivery sites and others were service delivery and administrative sites, the latter of which was also included. The final service delivery count for all FQHCs to 2008, minus the exclusions noted here, was 122.

County Data

Counties were identified as rural or non-rural as reported by the Georgia DCH, DPH, OHIP. There were a total of 108 rural counties and the number of those counties remained stable over the period of this study. Each county in each database was identified as rural or non-rural for use in analyses across all databases, and designations remained consistent across all years under study, 2002 to 2008.

Population Data

Population counts were arranged by variables of race, age groups and gender for each county in Georgia. Race (Black, White and Other), age (18-44 and 45-64) and gender (male and female) population counts by county were used as denominators for calculating per capita hospital and ED discharge rates. Population data by payer type was not available.

Mapping and Geocoding

The FQHC locations spreadsheet was imported into ESRI ArcMap v 10 for the purpose of geocoding FQHC addresses to mark locations. Also, the ArcMap v 10 extension for network analysis was used to determine service areas based on a 30-minute drive time from each FQHC location. The 30-minute drive time via primary and secondary roads only was determined to be a “reasonable” drive time for optimal access to FQHCs based on literature reviews discussed earlier in this paper.

Data Analysis

Per capita hospital and emergency department discharges for each county (N=159) and each year (2002 to 2008) were calculated using population variables that matched the control variables. The effect of federally qualified health centers on per capita discharges was investigated as a nested effect within counties.

Descriptive statistics were used to explore data, including graphical presentations, means, standard deviations, and percentages. A general linear model (GLM) was employed to investigate the significance of adding FQHCs within Georgia counties (N=159), years (2002 to 2008), controlling for the following factors: age-groups (18-44 and 45-64 years), gender (male, female), race (Black, White, and Other), payer type (Medicaid, Medicare, private insurance, self-pay, PeachCare [CHIP], and all other payers), county type (rural and non-rural).

CHAPTER 4

RESULTS

Introduction

The purpose of this study was to examine the relation between FQHC presence within counties and their respective per capita hospital and emergency department discharges for ambulatory care sensitive chronic conditions. Results presented here include descriptive statistics of hospital and ED discharges for ACSCCs, population groups for age, gender, race, and payer type for the period 2002 to 2008. FQHC counts, locations, and 30-minute drive times using primary and secondary roads were summarized for years up to 2001 (baseline) and then for the period 2002 to 2008. To normalize per capita rates, a natural logarithm was used. The initial general linear model measured per capita differences in hospital and ED discharges and for FQHCs within counties. Random effects were added for FQHCs within counties by year. Analysis using a repeated measures design, years (2002 to 2008), within counties, and controlling for age-group, gender, race, and payer type are presented.

Summary Statistics

Hospital Discharges and Emergency Department Discharges

Frequencies were explored for mean ACSCC per capita hospital and ED discharges for during the period 2002-2008. Hospital discharges totaled 123,227 based on valid cases as defined by non-missing data (See Table 3 for a report of counts). Males made up 47.8% of cases and females 52.2% of cases. There were 41,362 valid events among hospital discharges for ages 18-44 and 81,865 among ages 45-64 years old.

There were 43,047 (35%) rural hospital discharges and 79,812 (65%) non-rural counties. By race, there were 66,566 (54%) White people of whom 24,870 (37.4%) were rural. Among Black people there were 52,547 (42.7%) hospital discharges, of whom 17,249 (32.9%) were rural. Finally, the remainder made up Other races at 4,092 (3.3%), and of these, 924 (22.6%) were rural residents. In order of year of lowest to highest number of discharges, 2002 represented the lowest year with 16,905 discharges followed by 2005, 2004, 2006, 2003, 2007, then 2008 with 18,539 discharges, indicating an increase in hospital discharges by 8.8% from 2002 to 2008. Figure 6 represents the percent change in ACSCC hospital discharges by year.

Table 3

Number of Hospital and ED Discharges by Control Variable

Variable	Hospital Discharges	Emergency Dept. Discharges
Male	58,784	92,132
Female	64,319	109,199
18-44 Years	41,362	93,317
45-64 Years	81,865	108,014
Rural	43,047	73,080
Non-Rural	79,812	126,861
Black	52,547	88,696
White	66,566	104,121
Other Races	4,092	8,514

Hospital Discharges: Valid Counts: Gender N=123,227; Age-group N=123,227; Rural Non-rural status N=122,859; Race N=123,205

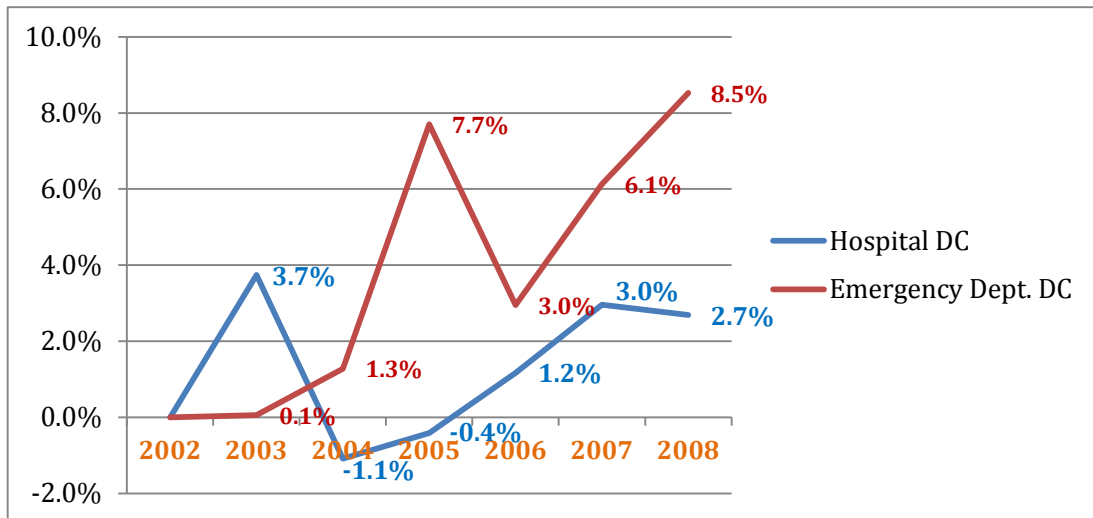
ED Discharges: Valid Counts: Gender N=201,331; Age-group N=201,331; Rural Non rural status N=199,941; Race N=201,331

Of ED discharges, 201,331 were valid. Males made up 92,312 (45.8%) ED discharges and females numbered 109,199 (54.2%). The 18-44 year group represented 93,317 (46.4%) while the older age group 45-64 represented 108,014 (53.6%) of cases. There were 73,080 rural ED discharges and non-rural areas 126,861 (63.4%) ED

discharges. Among race groups, White people numbered 104,121 (51.7%) and of those, 39,025 (37.8%) were rural residents. Black people numbered 88,696 (44.1%) and were represented by 32,425 (36.7%) rural residents. Other races numbered 8,514 (4.2%) and of those 1,630 (19.2%) were rural. In ascending order, which incidentally represents chronological order, ED discharges increased from 24,600 in 2002, and each year 2003, 2004, 2005, 2006, 2007, and finally in 2008, there were 34,416 ED discharges. Overall ED discharges increased by nearly 28.5% from 2002 to 2008. Figure 6 represents the percentage change in numbers of hospital and emergency department discharges from 2002 to 2008. The reference point is 2002 since it represents the year of the lowest number of discharges for both hospital and emergency department. The numbers increased overall for both by 1,634 for hospital discharges and 9,816 for ED discharges.

Figure 6

Percent Change in Hospital and ED Discharges from 2002 to 2008

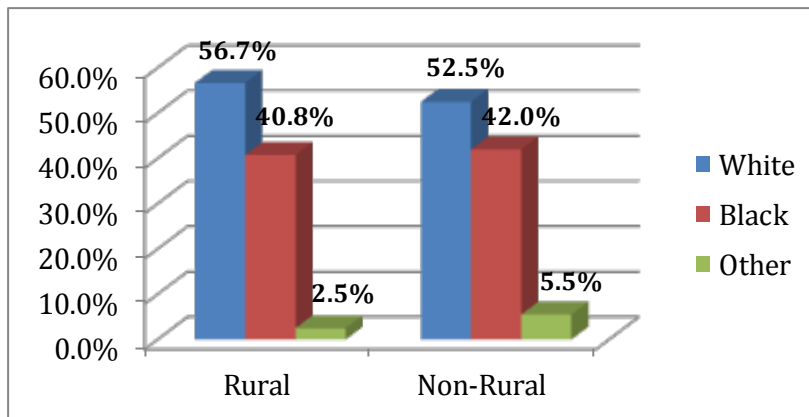


2002 Hospital Discharges = 16,905; 2002 ED Discharges = 24,600

Figure 6 represents changes in hospital and ED discharges beginning in 2002 as the reference point. Between 2002 and 2003 there was an increase by 3.7% in hospital

Figure 8

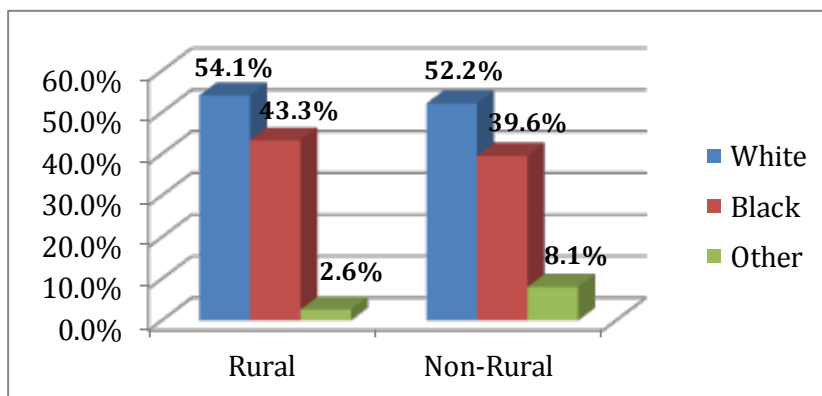
Hospital Discharges by Race Group and Rural/Non-Rural



discharges and then a substantial decrease by 4.8% from 2003 to 2004 followed by steady increases over time until 2007, when there was a decrease by 0.3% in 2008.

Figure 7

Emergency Department Discharges by Race Group and Rural/Non-Rural Residency



Per Capita Rates by Variables

Mean per capita rates varied for hospital and emergency department discharges.

Although ED discharges increased by 30%, per capita ED rates were more stable than hospital discharges over the 2002-2008 period with mean per capita rates ranging from 0.00179 to 0.00637, hospital discharges ranged from 0.00131 to 0.00453. The fluctuations were more dramatic for mean per capita hospital discharges from year to year than ED discharges were (see Figures 9 and 10). Mean hospital per capita rates increased by 24.7% from 2006 to 2007, and by 25.67% from 2007 to 2008 for a total increase of 44% over the two years.

Figure 9

Mean Per Capita Hospital Discharge Rate by Year

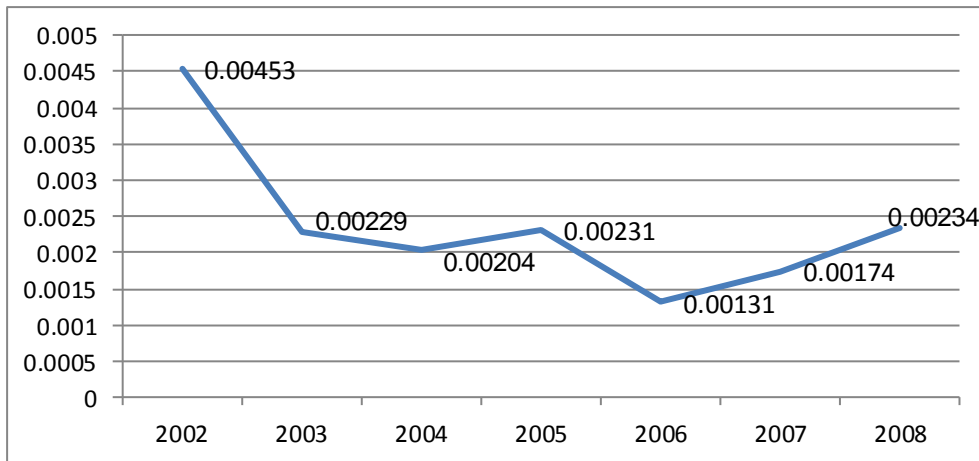
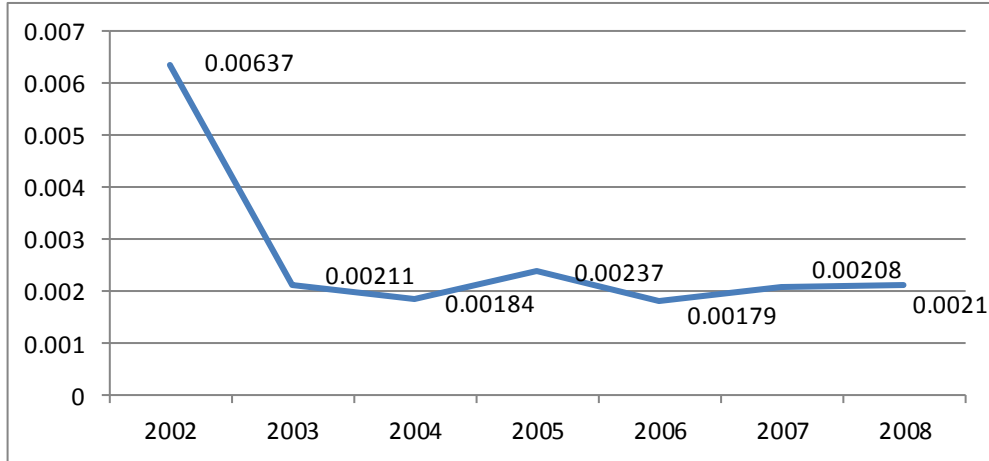


Figure 10

Mean Per Capita Emergency Department Discharges by Year



Hospital and emergency department discharges by payer type were ranked to determine if some explanation of differences in per capita means by year lies in understanding who used services. Private insurance represented the number one rank for both hospital and ED discharges, followed by self-pay for ED at 28.3% of all users, ranking 3rd at 19.2% of all hospital discharges. Self-pay groups raised a red flag because they embody a major problem in health care in the U.S.; unaffordability of consistent care if uninsured, and the subsequent cost of hospital care when negative consequences of health conditions can no longer be avoided. ED visits by Medicaid and self-pay group totaled 47% over the period 2002 to 2008 (see Table 4, PeachCare excluded).

Table 4

Ranking of Use by Payer Type (descending order)

Hospital Payer Type Ranking			ED Payer Type Ranking		
	Frequency	Percent		Frequency	Percent
Private insurance	38,784	31.6	Private insurance	57,840	28.9
Medicare	29,767	24.2	Self-pay	56,542	28.3
Self-pay	23,556	19.2	Medicaid	37,364	18.7
Medicaid	23,367	19.1	Medicare	34,798	17.4
All other payers	7,334	5.9	All Other Payers	13,322	6.7

Per capita hospital discharges depicted for rural and non-rural counties reveals the disparities that existed for rural counties. Across every payer type, per capita hospital rates were higher (see Figure 11). The same is true for ED discharges with widely varied rates for rural residents. Non-rural residents' per capita hospital discharges were 2/10ths per 100 for all payer types; however, rural residents approached nearly 1 per 100. ED use was similar to hospital discharge rates (see Figure 12).

Figure 11

Mean Per Capita Hospital Discharge Rate by Payer Type and Rural/Non-Rural Residency

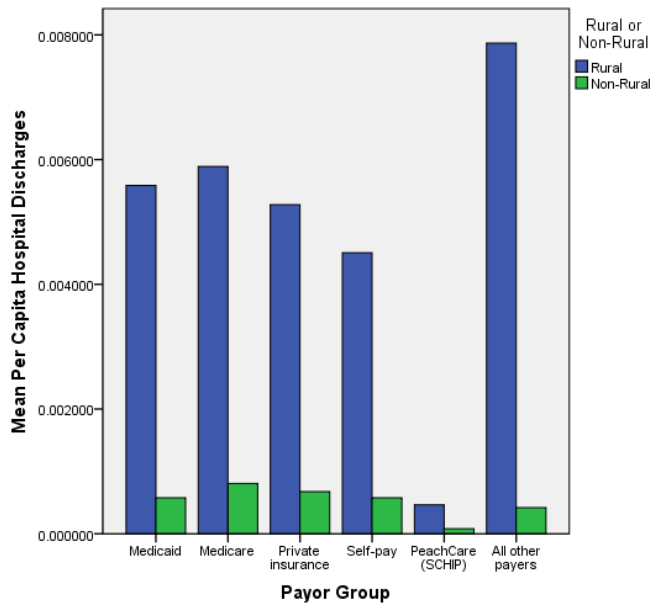
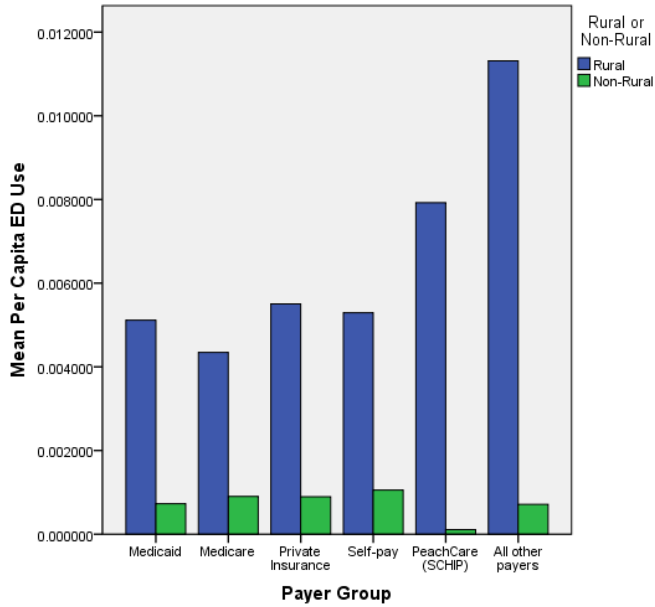


Figure 12

Mean Per Capita ED Discharge Rate by Payer Type and Rural/Non-Rural Residency



Payer type by race indicated that hospital and ED discharges occurred more often by privately insured patients of the White population, followed by Black, then Other. Self-pay was also highest in the White population, followed by Black, then Other. Medicare followed in the same order. Medicaid was highest among Black people.

Table 5

Hospital and ED Discharges: Distribution of Payer Type by Race

Payer Type (PT)*	White Percent of Payer Type		Black Percent of Payer Type		Other Percent of Payer Type	
	Hosp.	ED	Hosp.	ED	Hosp.	ED
Medicaid	48.1	47.7	48.6	49.3	3.3	3.0
Medicare	54.4	51.6	43.2	46.2	2.4	2.2
Private Insurance	59.4	54.9	36.8	40.3	3.8	4.8
Self-pay	50	51.4	45.9	43.1	4.1	5.5
All Other Payers	55.4	50.1	41.1	44.5	3.5	5.4

PeachCare excluded due to very small count; therefore, percentages may not equal 100.

Table 6 Distribution of Payer Type Within Race

Payer Type (PT)*	White Percent of Race Group		Black Percent of Race Group		Other Percent of Race Group	
	Hosp.	ED	Hosp.	ED	Hosp.	ED
Medicaid	16.9	17.2	21.6	20.9	18.4	13.3
Medicare	24.4	17.4	24.5	18.2	17.4	8.9
Private Insurance	34.7	30.7	27.3	26.4	35.3	32.9
Self-pay	17.7	28.0	20.6	27.6	22.6	37.1
All Other Payers	6.1	6.5	5.7	6.7	6.3	7.5

*PeachCare excluded due to very small count; therefore, percentages may not equal 100.

In a review with race, White people most often used private insurance, then Medicare, followed by self-pay, then Medicaid. Black people followed the same distribution except Medicaid was slightly higher than self-pay. Other race most often used private insurance, then self-pay, then Medicaid, and finally, Medicare. Over the study period, there was a steady decline in hospital discharges for private insurance by 4.6% and self-pay increased by 2.1% during the same period. Medicaid and Medicare

were fairly consistent across all years (Figure 13). ED discharges by privately insured people decreased by 4.9% and increased by 2.3% or self-pay (Figure 14).

Figure 13

Hospital Discharges by Payer Type and Year

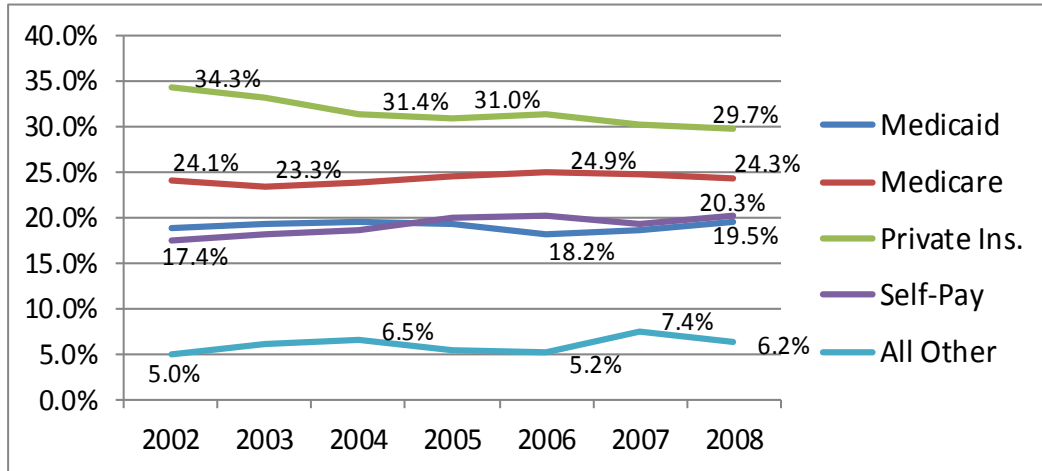


Figure 14

ED Discharges by Payer Type and Year

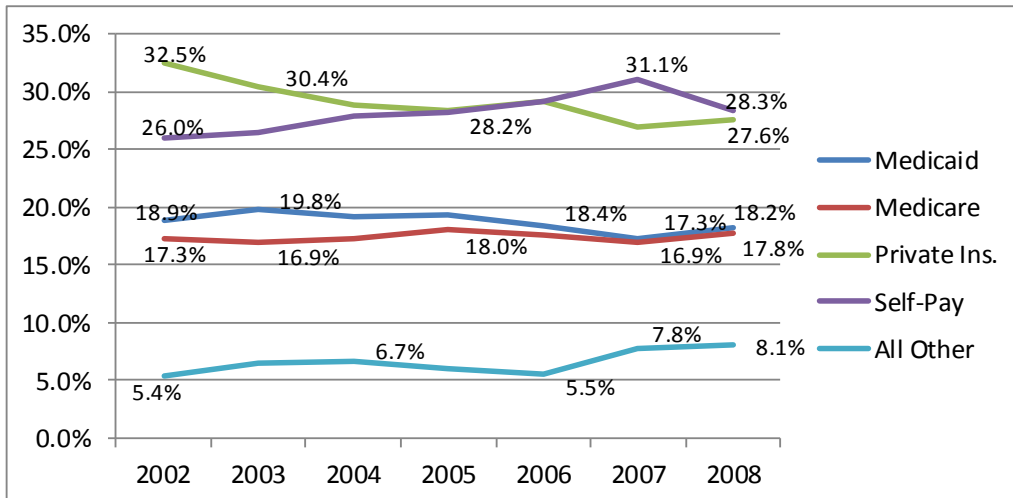
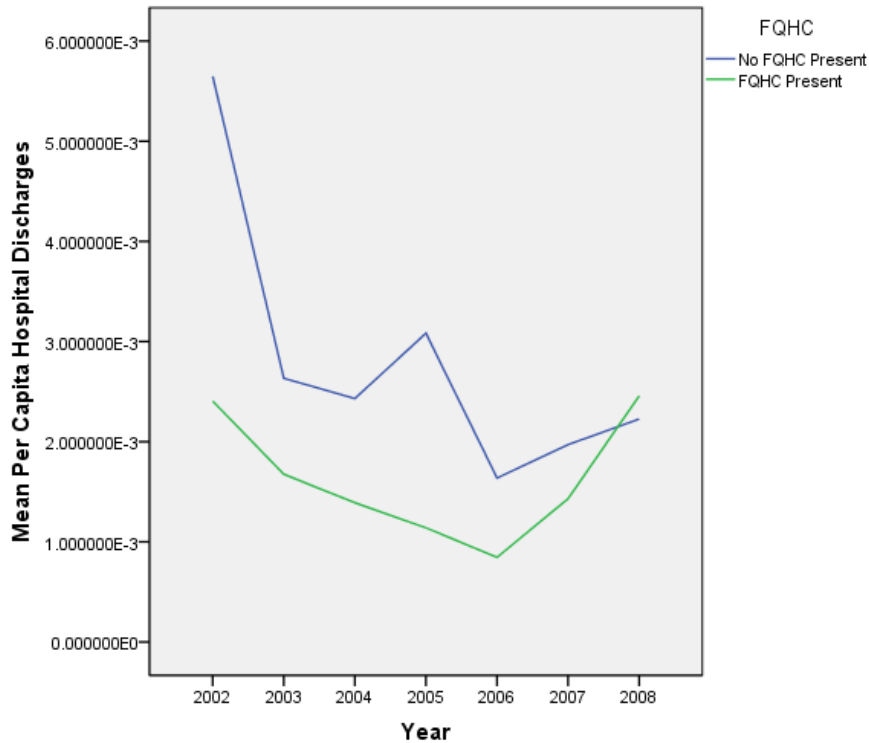


Figure 15

Mean Per Capita Hospital Discharges by Year for Presence or Absence of FQHC



The mean per capita rates for hospital discharges presented in Figure 15 varied over time in areas where there were no FQHCs. In 2002 the mean rate was approximately 5.5 then dropped to approximately 2.5 in 2003 with another decrease in 2004, followed by a 2005 increase by half a point, and then another decrease in 2006, which showed an increase for the remaining 2 years. The final per capita rate was lower than in the first 2 years of the study period, which may indicate a positive overall trend.

Where FQHCs were present, the mean rates were more stable until 2006 to 2008 where a steady increase in discharges was evident.

Figure 16

Mean Per Capita Emergency Department Discharges by Year for Presence or Absence of FQHC

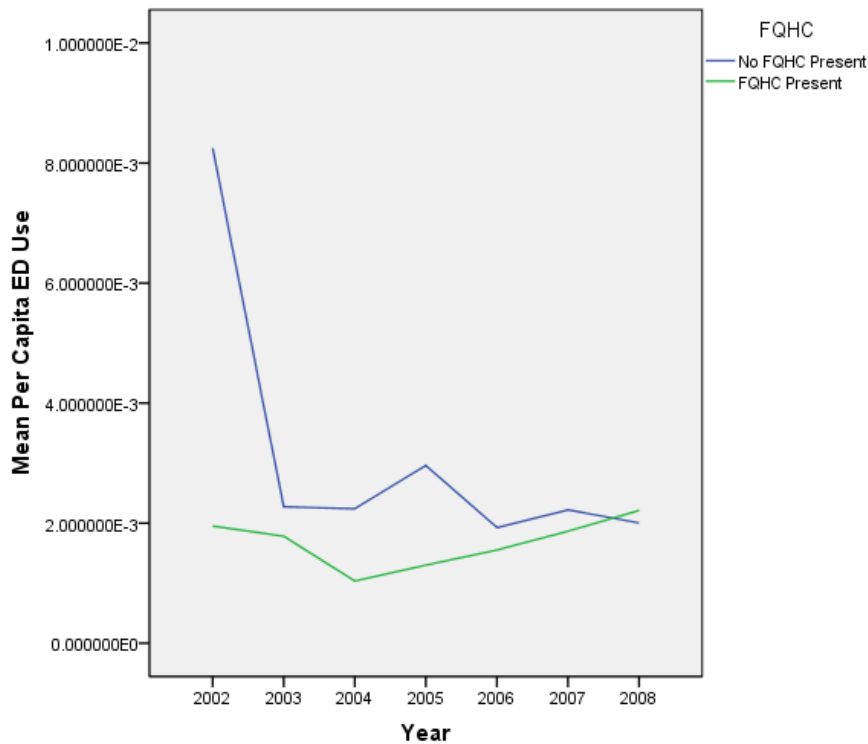


Figure 16 represents mean per capita ED rates that fluctuated year by year with rates consistently higher in counties having no FQHC present until 2007-08. The highest mean per capita year was in 2002 for counties with no FQHC present at just above 8 while the counties with FQHCs present started and remained at or below a mean per capita rate of 2 until 2008 following a steady incline from 2004 forward. Between 2004

and 2006 there was an increase in mean per capita rates by 1 for non-FQHC areas, but that rate fell back to 2 again in 2006 and remained fairly close to 2 to the end of the study period. ED discharges increased as indicated by a steady incline from 2004 to 2008 for counties with FQHCs present. A slight decline in ED visits was present from 2007 to 2008 in years when there were no FQHCs, and this is in contrast to hospitalizations that increased during the same period where o FQHCs were present.

Table 7

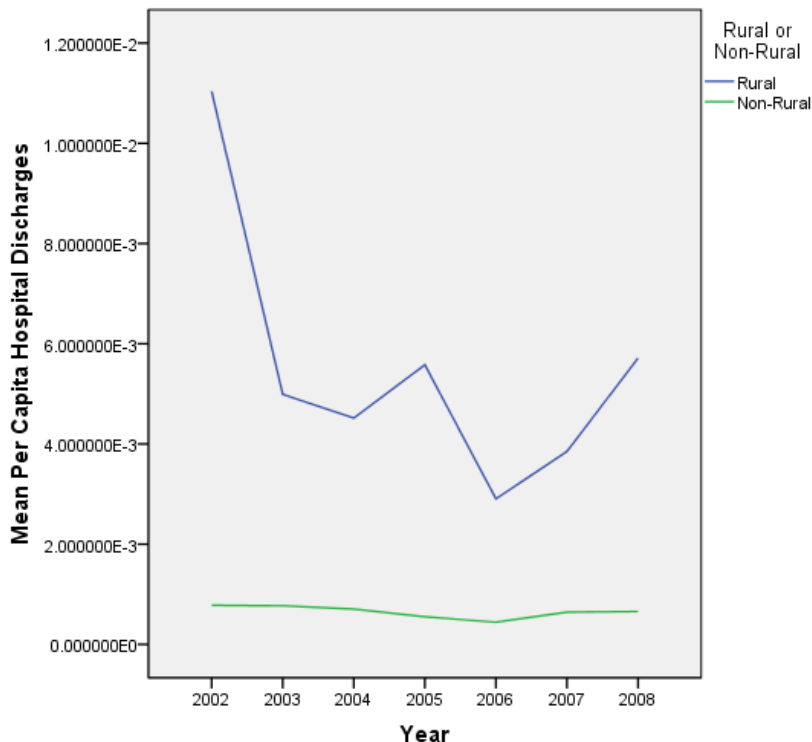
Mean Per Capita Hospital and ED Discharges by Variable

Variable	Hospital Discharges (State mean = .00236)	Emergency Department (State mean=.00257)
Male	0.00253	0.00250
Female	0.00219	0.00265
Ages 18-44 years	0.00153	0.00209
Ages 45-64 years	0.00277	0.00301
Rural	0.00551	0.00550
Non-Rural	0.00065	0.00090
White	0.00047	0.00045
Black	0.00119	0.00135
Other	0.04829	0.04148
2002	0.00453	0.00637
2003	0.00229	0.00211
2004	0.00204	0.00184
2005	0.00231	0.00237
2006	0.00131	0.00179
2007	0.00174	0.00208
2008	0.00234	0.00210
Medicaid	0.00235	0.00238
Medicare	0.00292	0.00227
Private insurance	0.00218	0.00254
Self-pay	0.00182	0.00256
PeachCare (SCHIP)	0.00027	0.00082
All other payers	0.00270	0.00418

A comparison of mean per capita rates for hospital and ED discharges for ACSCCs is presented in Table 7 for each variable. Males were hospitalized more often than females, but females visited the ED more often. Mean per capita hospital and ED discharges were highest among the Other race groups at 4.1 per 100 people and 4.8 per 100 people, respectively. ED discharges were greater for Other race groups at 92 times the mean per capita rate of White people and just over 30 times higher than Black people. Black people used the ED 3 times more than White people and were hospitalized 2.5 times more often. Medicare users were hospitalized more than other groups and “all other” payers utilized the hospital and emergency department more than other payer types. Rural areas in Georgia represented higher mean per capita rates of ED use at 6 times the per capita rate of non-rural areas, and among hospital discharges, rural rates

Figure 17

Mean Per Capita Hospital Discharges by Rural/Non-Rural Status

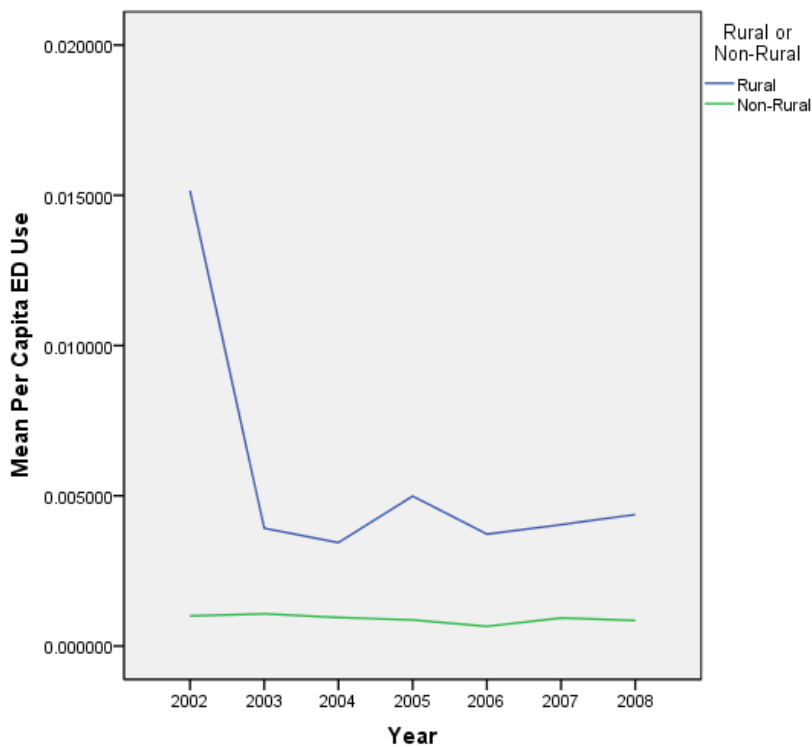


were 8.5 times higher than non-rural areas (Figures 17 and 18, also).

Rural areas consistently had higher rates of hospital discharges (Figure 17) and ED discharges (Figure 18). Non-rural areas appeared much more consistent in per capita rates across all years and non-rural areas maintained around the 0.5 to 1.0 per capita hospital discharge rate and just under 0.5 for ED discharges per capita, as opposed to rural areas that were higher.

Figure 18

Mean Per Capita ED Discharges by Year and Rural/Non-Rural Status

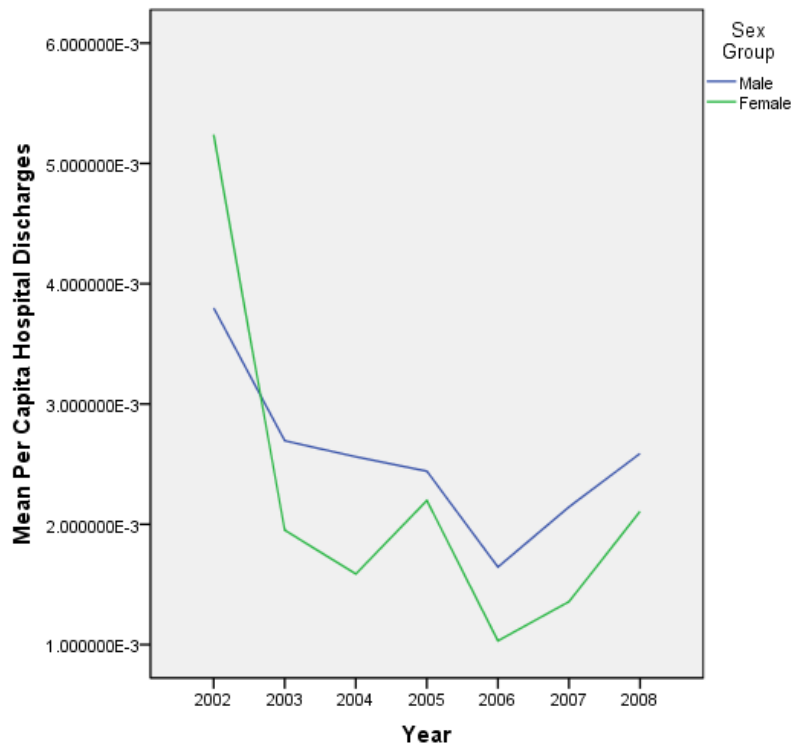


Males and females differed in hospital discharge rates (see Figure 19), but the patterns appeared similar from 2005 to 2008 showing an increase during that period for both genders. Females started at higher hospitalization rates in 2002, but dropped

drastically in 2003 and from 2003 onward, males were hospitalized consistently more often than females.

Figure 19

Mean Per Capita Hospital Discharges by Year and Gender



Among female ED rates, they started out at a higher rate and remained higher, though not by much in 2003, and were slightly lower or equal until 2007 when male rates began to rise and female rates decreased, taking a divergent path. Women utilized the emergency department more than men at a ratio of 1.06, while men were hospitalized more than women at a ratio of 1.16. In Figure 20, male and female mean per capita rates over time were similar for ED discharges until they diverged in 2007, and were somewhat similar over time, though at differing rates, for hospitalizations.

Figure 20

Mean Per Capita ED Discharges by Gender

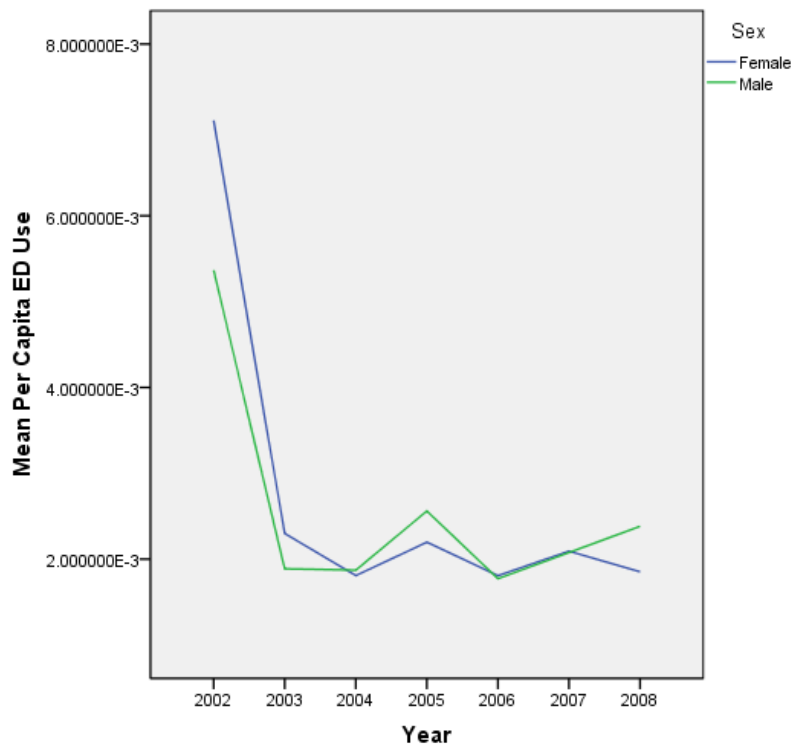


Figure 21

Mean Per Capita Decreases in Hospital Discharges by Age-Group

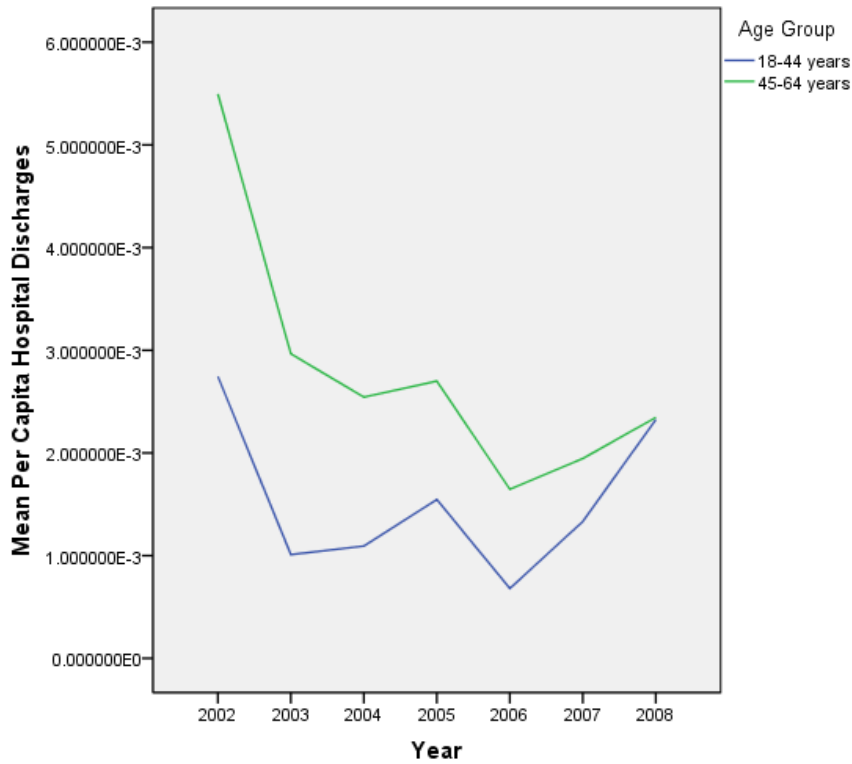
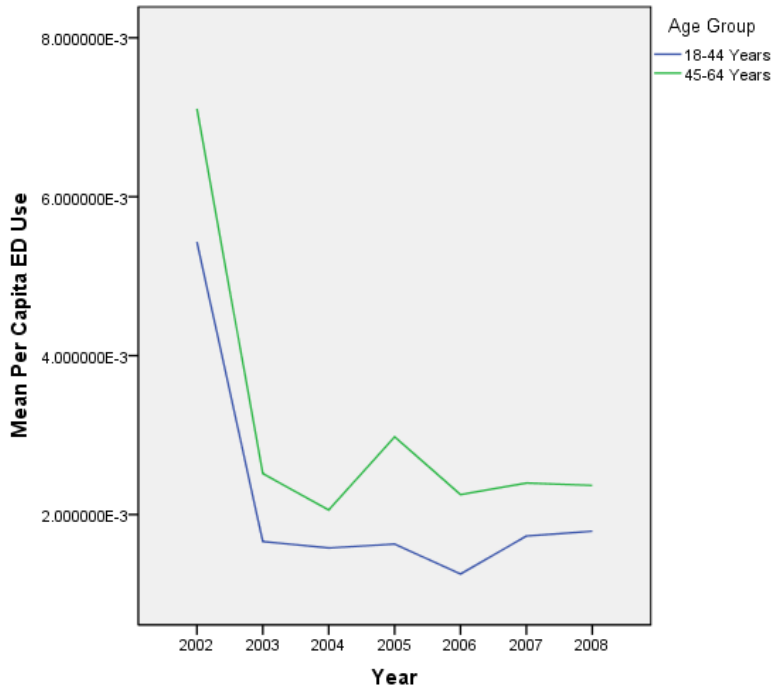


Figure 21 illustrates the difference in hospital discharges by age-group. Age group 45-64 was higher across all years until 2008. As might be anticipated, the older age cohort 45-64 years both utilized the ED and was hospitalized more often than the younger age-cohort (18-44 years). In 2008, both age groups were hospitalized at approximately equal per capita rates—around 2 discharges per person.

Figure 22

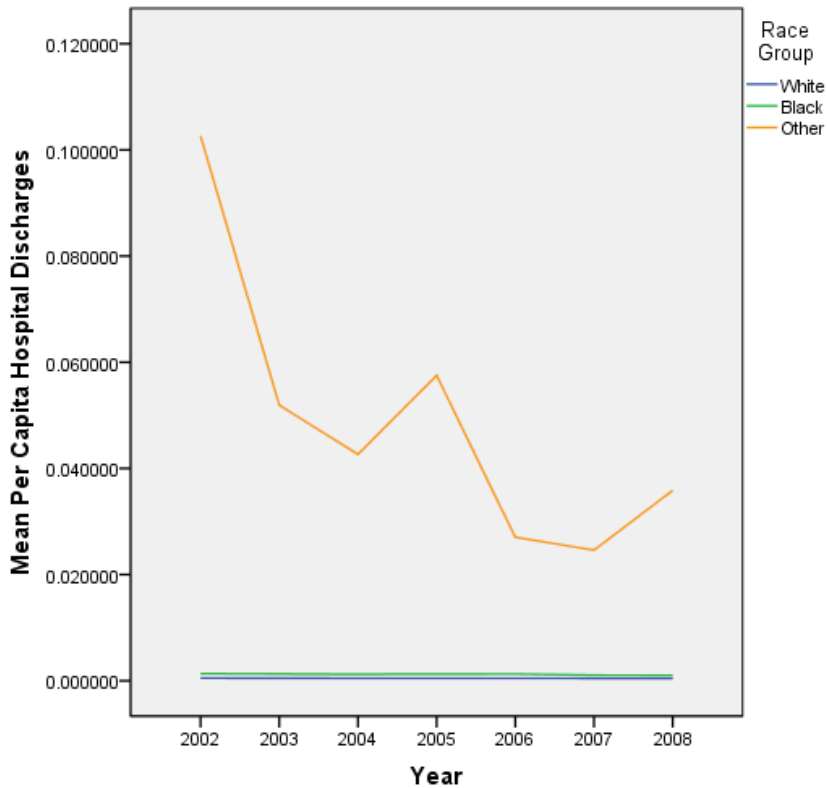
Mean Per Capita Decreases in ED Discharges by Age Group



ED visits were higher for 45-64 year olds at 1.44 times more per capita and hospitalizations represented 1.8 times the per capita rate of the 18-44 year group. Figures 21 and 22 show that ED discharges were lower among younger cohorts. From 2006-08 hospital discharges increased for both groups, where they converged in 2008. From 2007 to 2008, there was also an increase, though very slight. The mean ED use rate for 18-44 year old people was 0.00208 with a median of 0.000299 and for those 45-64 years, the mean was 0.00299 and the median was 0.000524.

Figure 23

Mean Per Capita Hospital Discharges by Race Group



In Figures 23 and 24, the differences in hospital and ED discharges are depicted in a comparison of mean per capita rates by race groups. Hospital discharges depicted an overall decrease in the Other race group (Alaskan Native, Asian, American Indian, Pacific Islander, Multiracial), starting at 0.1 in 2002 and after ups and downs through all years 2002 - 2008, ending at nearly 0.04 per capita in 2008. Comparatively, the Black and White race groups were stable through all years. ED discharges reflected higher per capita rates for the Other race group as well (Figure 24), with the same stable rate for

Black and White groups. In 2008, there was an increase in both hospital and ED discharges.

Figure 24

Mean Per Capita ED Discharges by Race Group

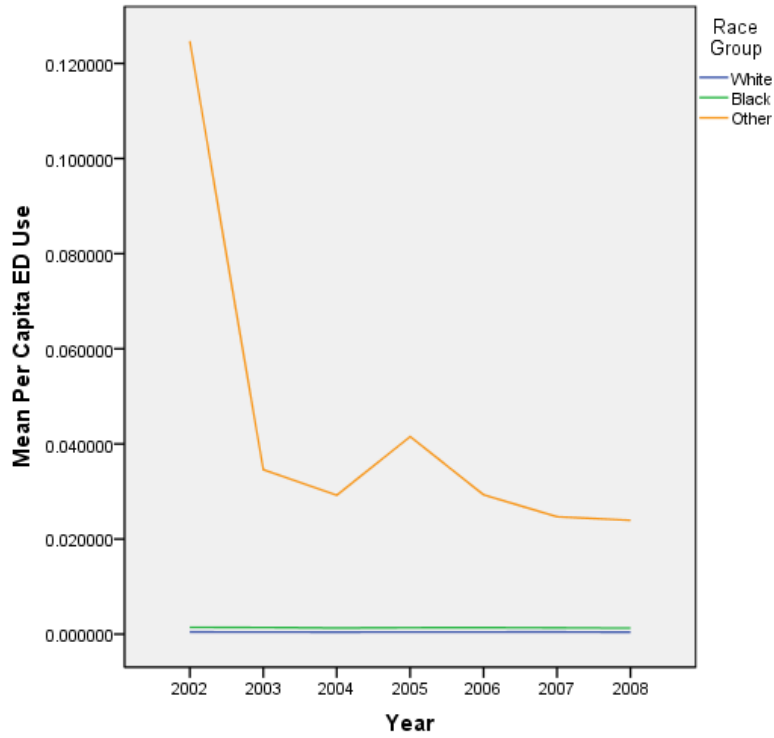


Table 8

ACSCC Hospital Discharges by Condition: Percent Distribution and Totals

ACSCC Hospital Discharge	Year							Total
	2002	2003	2004	2005	2006	2007	2008	
Angina	6.9	6.0	5.6	5.1	4.6	4.1	3.7	6,306
Asthma	16.7	17.1	16.4	17.0	16.1	15.6	15.5	20,139
Chronic obstructive pulmonary disease	17.9	17.3	16.0	17.0	16.9	16.6	16.9	20,890
Congestive heart failure	23.0	24.4	25.0	25.1	25.2	24.0	22.6	29,816
Diabetes wth ketoacidosis or hyperosmolar coma or other coma	9.7	9.7	10.2	10.0	10.4	10.4	10.8	12,533
Diabetes wth oth spec or unspec complications	7.4	7.2	7.9	7.9	8.0	8.1	7.9	9,579
Diabetes mellitus wo mention of comp or unspec hypoglycemia	6.2	5.9	5.9	5.3	5.6	5.5	5.3	6,981
Grand mal and other epileptic conditions	3.1	3.0	3.7	3.3	3.9	6.6	8.6	5,719
Hypertension	8.1	8.3	8.4	8.2	8.4	8.3	7.8	10,121
Tuberculosis nonpulmonary	0.3	0.3	0.2	0.2	0.2	0.1	0.2	264
Pulmonary tuberculosis	0.9	0.7	0.7	0.8	0.7	0.6	0.6	879
Total	16,905	17,563	17,373	17,301	17,506	18,040	18,539	123,227

In Table 8, chronic conditions for ACSC hospital discharges are shown in percentage distribution by condition and year. Hospitalizations increased for two of the diabetes conditions: diabetes with ketoacidosis or hyperosmolar coma or other coma and diabetes with other specified or unspecified complications showed increases over the 2002 to 2008 period (N=22,112). Grand mal and other epileptic conditions showed an increase over the seven-year period, from 3.1% of hospitalizations by year to 8.6%, an increase by nearly 64% (N=5,719), which is remarkable. Other conditions showed overall decreases; however, hypertension did not appear to show a substantial decrease. All other conditions indicated sporadic increases and decreases with the exception of angina.

ED discharges by condition are found in Table 9. Like hospital discharges, ED discharges for angina decreased over time, asthma, and chronic obstructive pulmonary disease and congestive heart failure remained relatively stable. The two conditions were higher over time for hospitalization; diabetes with ketoacidosis or hyperosmolar coma or other coma and diabetes with other specified or unspecified complications, showed decreases for ED use. Conditions showing increases were diabetes mellitus without mention of complications or unspecified hypoglycemia (N=24,435) and again, grand mal and other epileptic conditions (N=11,177). Hypertension maintained a percentage of approximately 21% throughout the seven years.

Table 9

ACSCC ED Discharges by Condition: Percent Distribution and Totals

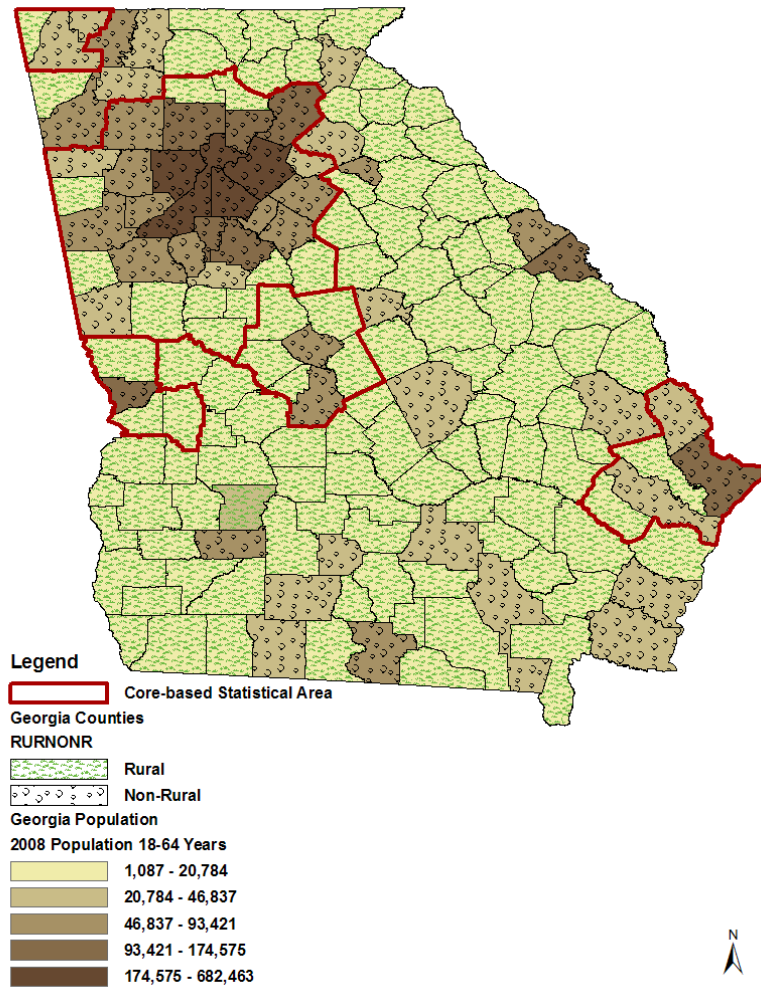
ACSCC ED Use	Year							Total
	2002	2003	2004	2005	2006	2007	2008	
Angina	5.8	5.4	5.3	4.9	4.6	4.3	4.0	9,742
Asthma	27.0	27.6	25.7	25.6	24.4	23.3	22.3	50,228
Chronic obstructive pulmonary disease	12.6	13.2	12.2	13.1	12.9	12.3	12.4	25,470
Congestive heart failure	7.4	7.1	7.4	7.6	7.2	6.7	6.1	14,144
Diabetes with ketoacidosis or hyperosmolar comor or other coma	1.3	1.4	1.4	1.3	1.4	1.2	1.2	2,609
Diabetes with oth spec or unspec complications	9.5	9.3	9.9	9.6	9.6	9.2	8.6	18,857
Diabetes mellitus wo mention of comp or unspec hypoglycemia	11.9	11.5	12.1	12.3	12.8	12.3	12.2	24,435
Grand mal and other epileptic conditions	3.0	2.9	3.2	2.9	3.8	9.0	11.8	11,177
Hypertension	21.6	21.5	22.7	22.7	23.3	21.7	21.4	44,527
Tuberculosis nonpulmonary	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23
Pulmonary tuberculosis	0.0	0.1	0.1	0.1	0.1	0.0	0.0	119
Total	24,600	26,131	26,470	28,680	29,552	31,482	34,416	201,331

Tables, graphs, and some discussion of data were presented as summary statistics. To gain an understanding of the State of Georgia in geographic terms, its distribution of rural and non-rural counties, and FQHC locations, maps were created to depict these facts. The State of Georgia is made up of 159 counties for a total of 59,424.8 square miles of which 57,906.1 is land area.

A map of the 2008 population, ages 18 to 64, by core-based statistical area and rural or non-rural county status is presented in Figure 25. Core-based statistical area (CBSA) is a collective term for metro and micro areas where a metro area is made up of a core urban area of 50,000 or more people and a micro area has at least 10,000 people and <50,000. The CBSA is noted to have one or more counties that have a high degree of social and economic integration (measured by commuting to work) with the urban core (U.S. Bureau of the Census, 2012). The population in Georgia 18-64 years old was denser in non-rural areas, as might be expected given more employment opportunities in those areas. ED uses and hospital discharges were proportionally greater among rural counties which also make up the greatest area of Georgia, perhaps implicating geographic accessibility as potentially problematic in accessing FQHCs.

Figure 25

Population for Ages 18-64 by Core Based Statistical Area and Rural/Non-Rural County



FQHC Summary

Of 159 Georgia counties, 108 were rural and 47 were non-rural. Baseline FQHC service delivery locations (to 2001) numbered 77 and during the period 2002 to 2008 there were 45 FQHC additions (see Table 12), representing the period under study, as defined earlier.

Table 10

Federally Qualified Health Centers in Georgia to 2008

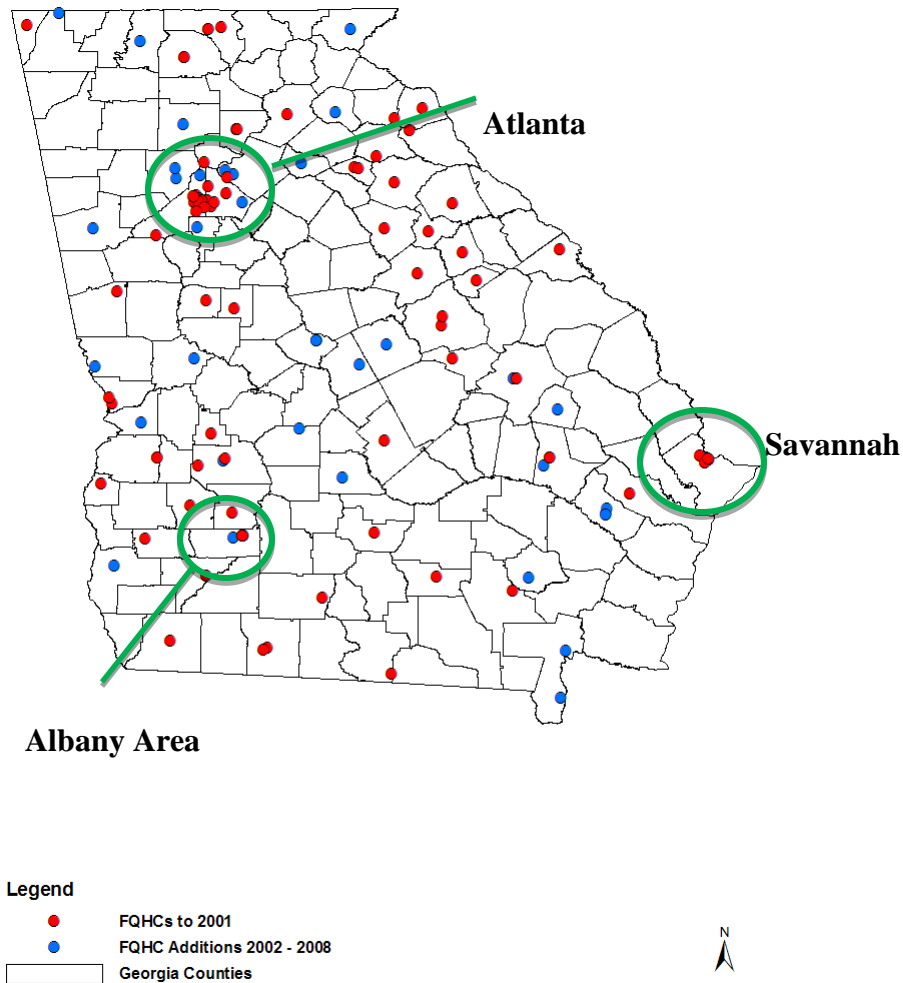
Total FQHC Service Delivery Sites	Rural # (%)	Non-Rural # (%)	Total
To 2001 (baseline)	47 (61)	30 (39)	77
2002 additions	1	0	1
2003 additions	4	3	7
2004 additions	3	2	5
2005 additions	3	2	5
2006 additions	2	1	3
2007 additions	5	5	10
2008 additions	11	3	14
2002 to 2008 additions	29 (64.4)	16 (35.6)	45

Twenty-two counties had first time FQHC additions during the 2002-08 period, while the remaining FQHCs were added to areas that already had FQHCs in place.

FQHCs that were present to 2001 (baseline) represented the baseline at 77 locations, (see Figure 26) where red circles indicate those locations present to 2001. FQHC additions during the 2002 to 2008 (see Figure 27) period totaled 45, indicated by blue circles. Of the 45 additions, 22 counties had FQHCs for the first time during the 7-year period (see Figure 27) denoted by counties outlined in blue. Those counties that did not have FQHCs prior to 2002 but gained them during the period 2002 to 2008 were: Banks, Barrow, Bibb, Candler, Carroll, Charlton, Chattahoochee, Cherokee, Clayton, Cobb, Dooly, Early, Harris, Long, Murray, Pierce, Rabun, Talbot, Twiggs, Walker, Wilcox, and Wilkinson, for a total of 22 counties.

Figure 26

Federally Qualified Health Center (FQHC) Locations to 2008

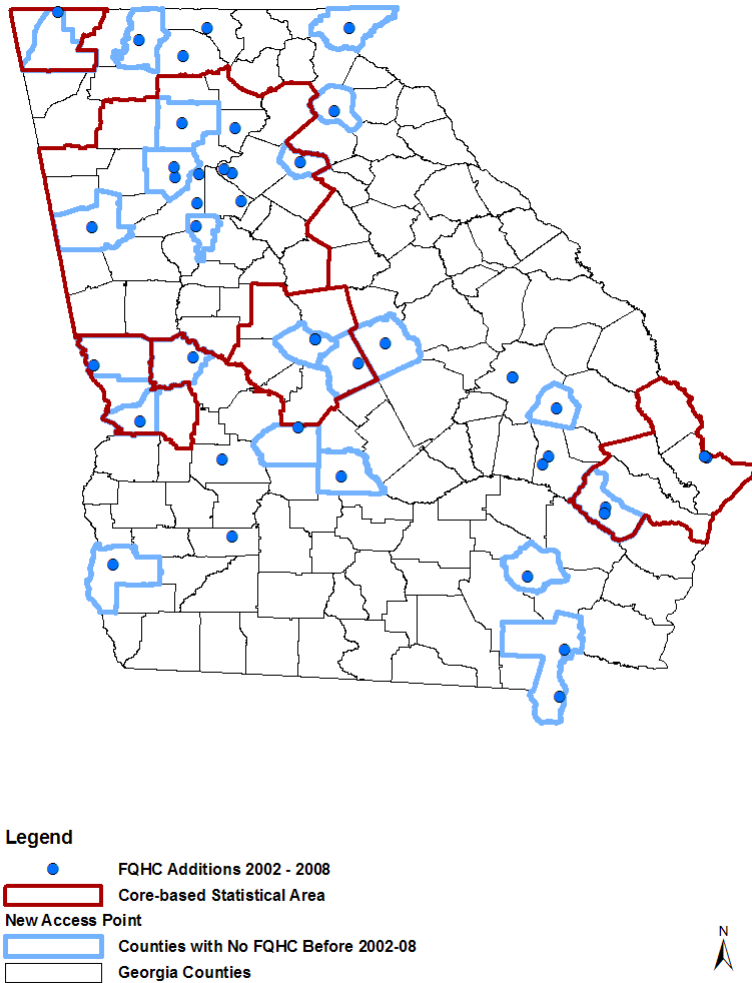


In urban areas, especially in the Atlanta metro area, Savannah, and the Albany area, there were clusters of FQHCs of five or more. Albany, Georgia had five locations to 2008; however, their clinics were more spread out, geographically. Atlanta had 17 locations to 2008 and the mix of locations varied from community based to school based clinics and homeless services. Savannah had 7 locations and they varied from dental and behavioral services, public housing locations and homeless shelter locations. Other areas

of Georgia, including Blue Ridge, Swainsboro, Reidsville, Norcross, and Ludowici, that had two or fewer FQHC locations.

Figure 27

FQHC Locations Added 2002-2008 and Counties with First Time FQHCs



A service area, defined as a 30-minute drive time to FQHCs was created using ESRI ArcMap v 10 Network Analysis extension. Of all the locations to 2001, 77 locations were geocoded then a network analysis extension was applied to determine

areas that fall within a 30-minute drive. See Figure 30 where the red circles represent the FQHC locations (N=77) and the surrounding boundaries shaded in red represent the area within a 30 minute drive to the FQHCs to the year 2001. In this same Figure, there are numerous gaps in available FQHC services indicating poor FQHC access for much of Georgia. Many counties were rural (indicated by the green patterns), but there were also numerous non-rural counties (as indicated in the legend) that did not have reasonable access to FQHCs within a 30-minute drive time.

Figure 28

Service Areas Representing 30-Minute Drive to FQHCs: to 2001

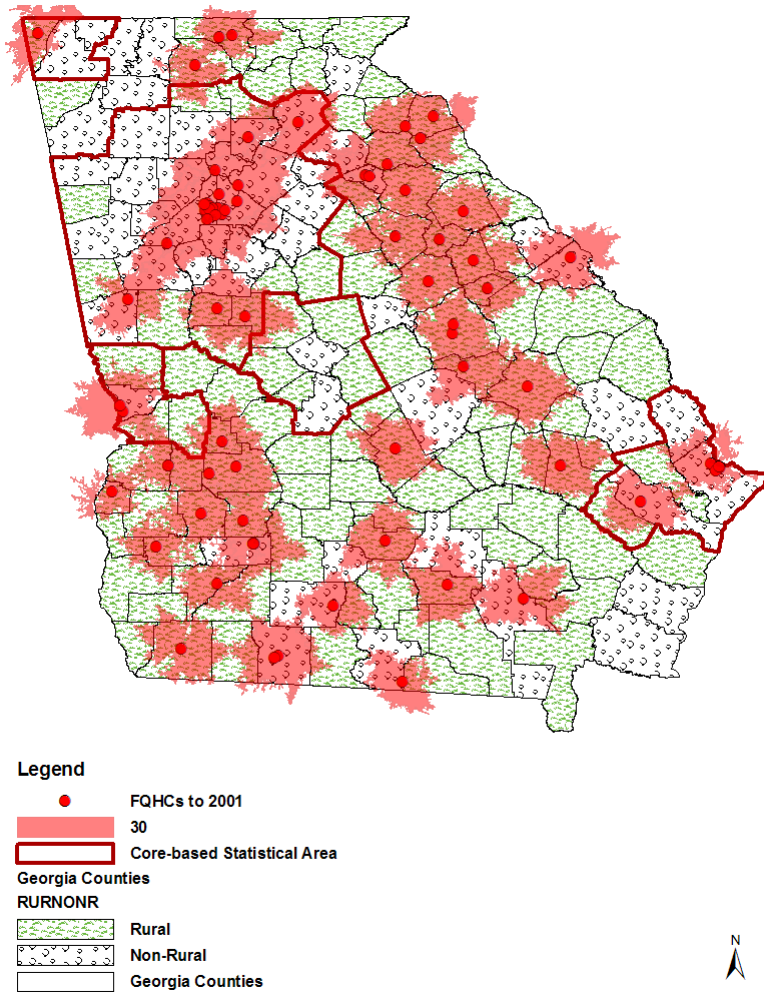
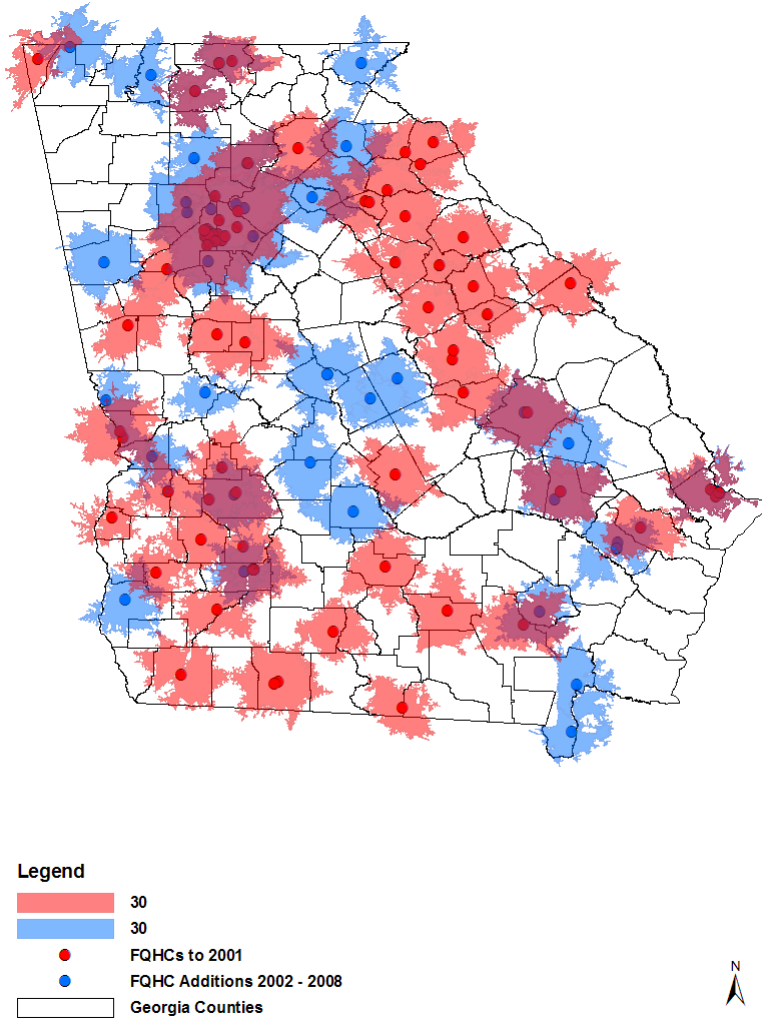


Figure 31 represents 30-minute drive times for FQHCs that were added (N=45) during the period under study from 2002 to 2008, as indicated in blue. Some areas not previously within a 30 minute drive gained better access during the study period.

Figure 29

Service Areas of 30-Minute Drive Times to 2008

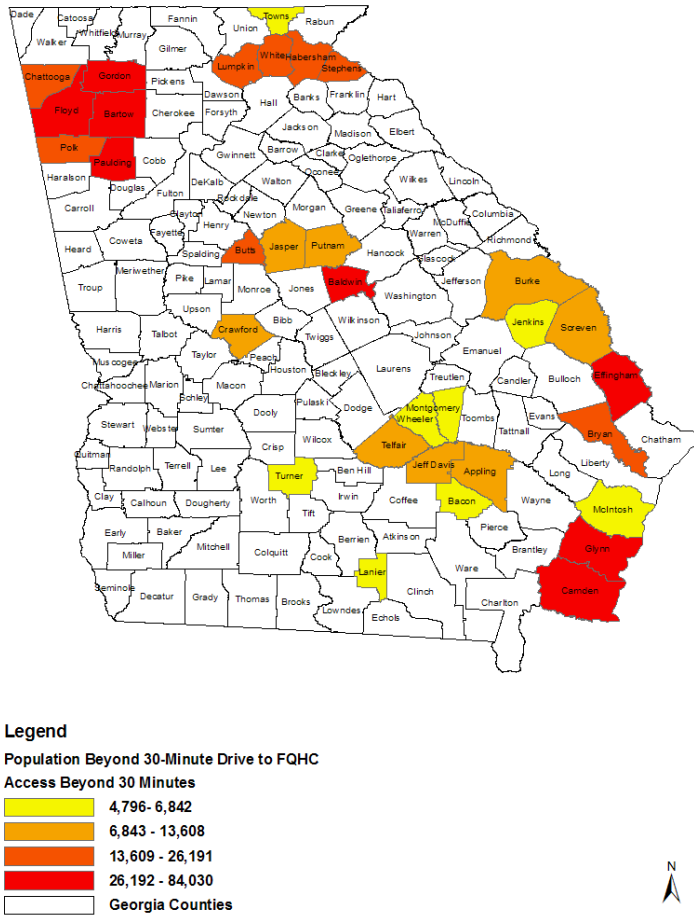


Multiple counties were 100% to almost 100% lacking access within a 30 minute drive to FQHCs (see Figure 30). Figure 30 also depicts ranges of population for counties outside the 30-minute drive to FQHCs. The total population between the ages of 18 and 64, represented by these counties, was 652,315 in 2008, a substantial number of people without guaranteed access to primary care. The mean per capita rate for counties with no

FQHC within 30-minutes for ED discharges was 0.0061 and the mean for hospital discharges for those same counties was 0.0055, both higher than the state mean for hospital and ED discharges at 0.0024 and 0.0026, respectively. Additionally, there were many counties without full access, indicated by a lack of up to half of the county area outside 30-minute service areas, not depicted here. A review of Figure 29 shows some indication of less than adequate drive times for partial county access. These were counties that either did not share service areas with surrounding counties or the service area only slightly overlapped into the county boundary. Of these counties, 10 were non-rural with a population of 425,495 18-64 years old, and the remaining 22 counties were rural, representing 226,820 people 18-64 years old without reasonable access to FQHCs.

Figure 30

Population of Counties (N=32) Beyond a 30-Minute Drive to FQHCs



Mean per capita rates for hospitalizations and emergency department discharges have been described and presented in maps and tables to illustrate locations of health centers and per capita rates. Additionally, maps of service areas defined by 30-minute drive times to reach those 122 health centers during the 2002 to 2008 period were presented in the context of per capita rates. The following data reports represent findings from the inferential analysis.

Inferential Results

A general linear model was used to determine per capita rate variations in hospitalizations and emergency department uses for ambulatory care sensitive chronic conditions (ACSCCs) in counties with and without FQHCs.

In a fixed effect model of FQHCs within counties and excluding years, there was a significant difference in per capita ED discharges ($p < .0001$, $df=179$, R-square 0.0572) and in hospital discharges ($p < .0001$, $df=177$, R-square 0.0388), though effects were minimal. When random effects and years were added, there was also significant variation for ED use ($p < .0001$, $df=191$, R-square 0.0601) and hospitalizations ($p < .0001$, $df=190$, R-square 0.0406), again, with increased, but little effect. Per capita estimates for hospital discharges ED uses and corresponding p-values are reported in Table 11. The final model for ED discharges included FQHCs nested within counties in a repeated measures design with random effects, controlling for race, payer-type, and gender. Age-group was removed from the model due to insignificance. Significant ED differences were found for race, payer type and gender ($p < .0001$, $df=199$, R-square 0.1178), with increased effect, though still minimal.

Table 11

Per Capita Estimates for Hospital and ED Discharges

Year	Hospitalizations		Emergency Department	
	Estimate	P-value	Estimate	P-value
2002	-0.000481	0.3967	-0.000689	0.1595
2003	-0.001314	0.0182	-0.001381	0.0034
2004	-0.001324	0.0177	-0.001599	0.0005
2005	-0.001817	0.0007	-0.001658	0.0002
2006	-0.002207	<.0001	-0.001275	0.0036
2007	-0.001042	0.0421	-0.000535	0.2010
2008†	0.000000	.	0.000000	.

†Set to zero (0) by SAS

Table 12

P-values by Variable for Hospital and ED Discharges

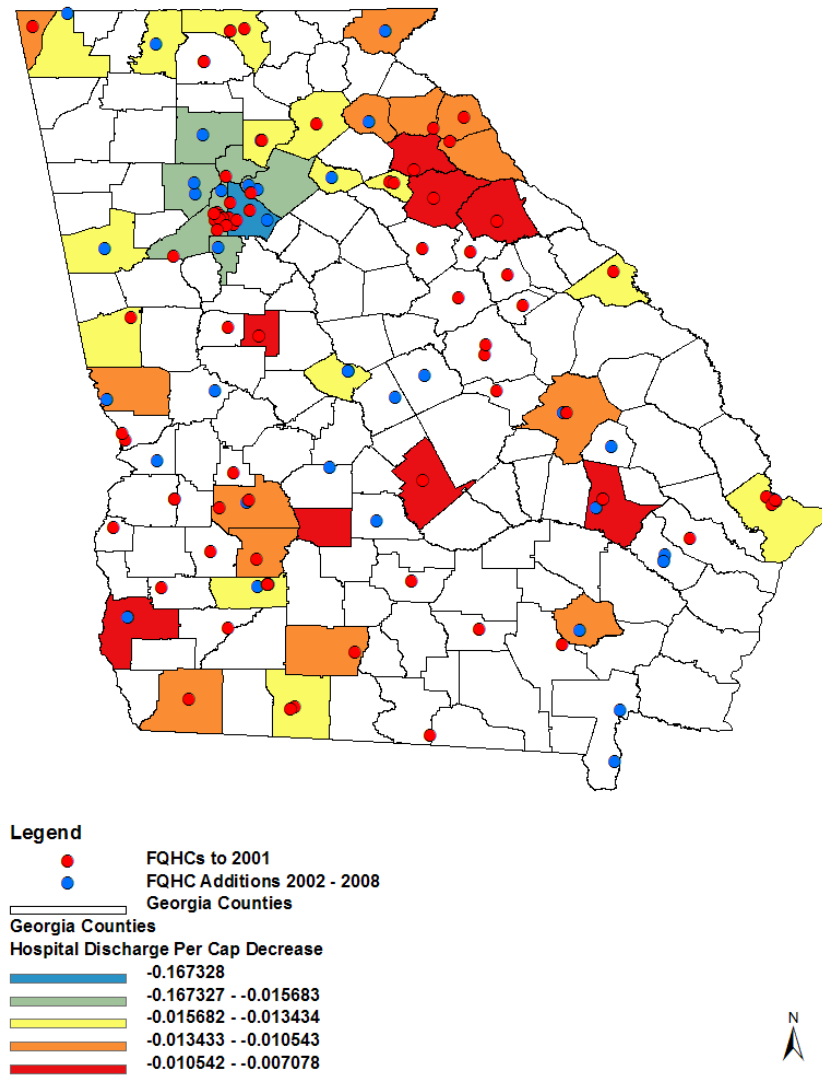
Variable	Hospital Discharges	Emergency Department Discharges
Gender	0.0774	0.3724
Race	<.0001	<.0001
Age-Group	<.0001	<.0001
Payer Type	<.0001	<.0001

Three of four control variables were highly significant and gender was not at all significant. Per capita hospitalizations decreased significantly ($p < .001$, $df = 207$, $R^2 = 0.0800$) and estimates are depicted by county in Figure 31.

Among counties in the two lowest tiers of the scale, all were rural with one exception. In the top two tiers (those counties showing the greatest decreases), all were non-rural counties. The greatest hospital discharge decreases were among non-rural counties as indicated in Table 15. In counties with first time FQHCs during the 2002-08 study period, 8 were non-rural and 4 were rural.

Figure 31

Significant Per Capita Decreases in Hospital Discharges



Eight counties ranged in decreases from 0.7 per 100 and of those, 2 counties had new access points during the study period. Additionally, baseline access points were present. One county indicated the greatest change and also had access to multiple FQHCs. Counties shaded in red represent those with the least amount of decrease in

hospital discharges; orange is the next highest decrease, followed by yellow, then green.

Finally, blue was representative of only one county showing the greatest decrease.

Table 13

Range of Hospital Discharge Decreases by County

Range of Hospital Discharge Decreases (ascending order)	Counties *denotes rural county; denotes new FQHC county site	
-0.0071 to -0.0105	Crisp* Dodge* Early* Lamar* Madison*	Oglethorpe* Pierce* Tattnall* Wilkes*
-0.0114 to -0.0134	Banks* Colquitt Dade* Decatur* Elbert* Emanuel* Fannin*	Franklin* Harris* Lee* Sumter* Hart* Rabun*
-0.0136 to -0.0157	Barrow Bibb Carroll Chatham Cherokee Clarke Dougherty	Forsyth Hall Murray Richmond Thomas Troup Walker
-0.0162 to -0.1673	Clayton Cobb DeKalb	Gwinnett Fulton

Figure 32

Significant Per Capita Increase in Hospital Discharges

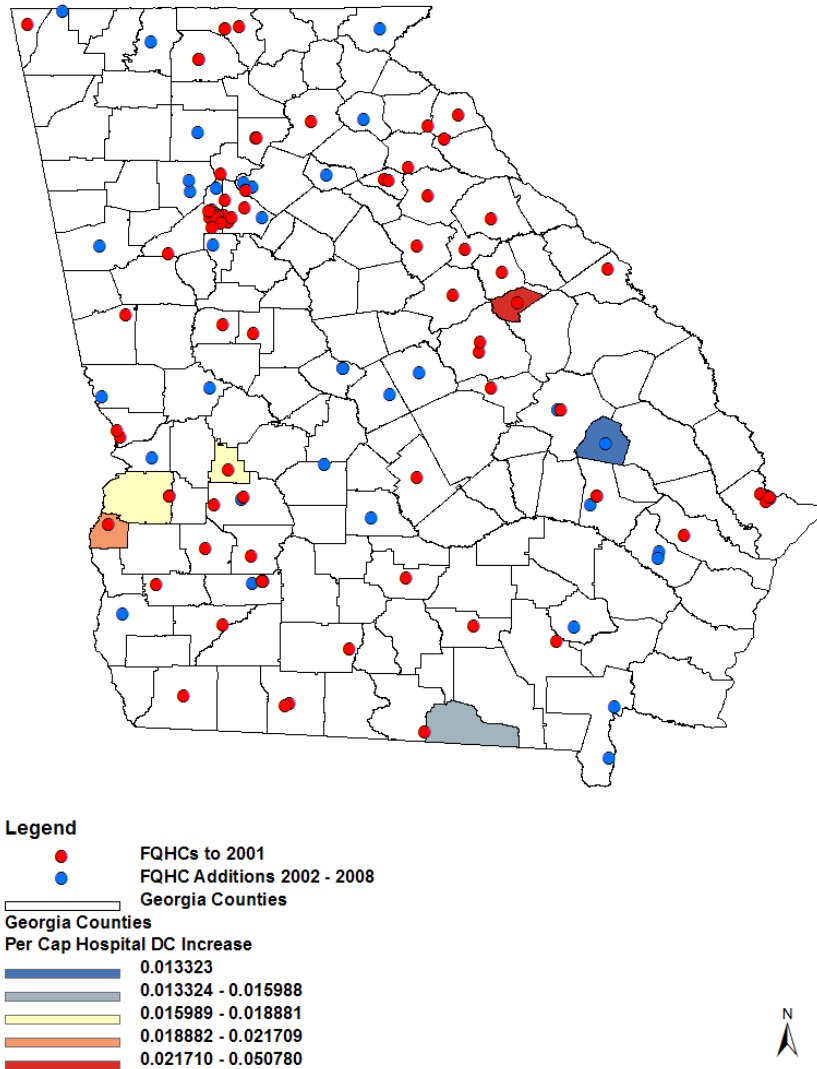


Figure 32 represents increases in hospital discharges during the study period. The following counties showed increases in hospitalizations as follows: Glascock at 0.051 and Quitman at 0.0217 in the lowest range; Schley at 0.0189 in the next to lowest; Echols at 0.0156, Stewart at 0.0184, in the 2nd highest range, and finally, Candler at 0.01332 at the highest range. All counties in these ranges were rural.

Figure 33

Per Capita Decrease in Hospitalizations: Counties with No Previous FQHC

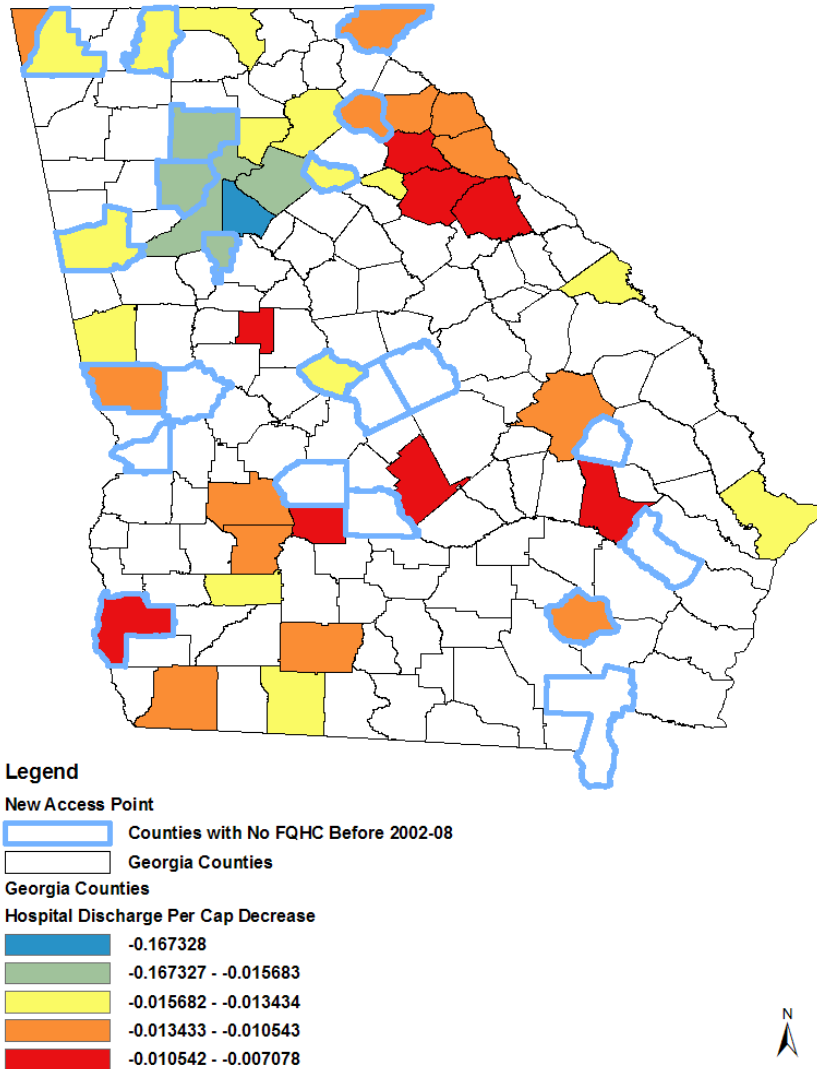


Figure 33 represents decreases in per capita hospital discharges. Nine counties did not indicate per capita decreases in hospital discharges; those were Chattahoochee, Talbot, Twiggs, Wilkinson, Dooly, Wilcox, Candler, Long (with 2 FQHC additions) and Charlton (with 2 FQHC additions).

In Figure 33, counties with no previous FQHC are outlined in blue. Nine counties did not reflect a decrease in hospital discharges following a first time FQHC addition to the county. Hospital discharges decreased in first time FQHC counties for 13 counties ranging from 0.007 to 0.167; however, the highest decrease was 0.0151 in Cherokee County and 0.0159 in Cobb County for those first time FQHC counties.

Figure 34

Per Capita Increases in Hospitalizations

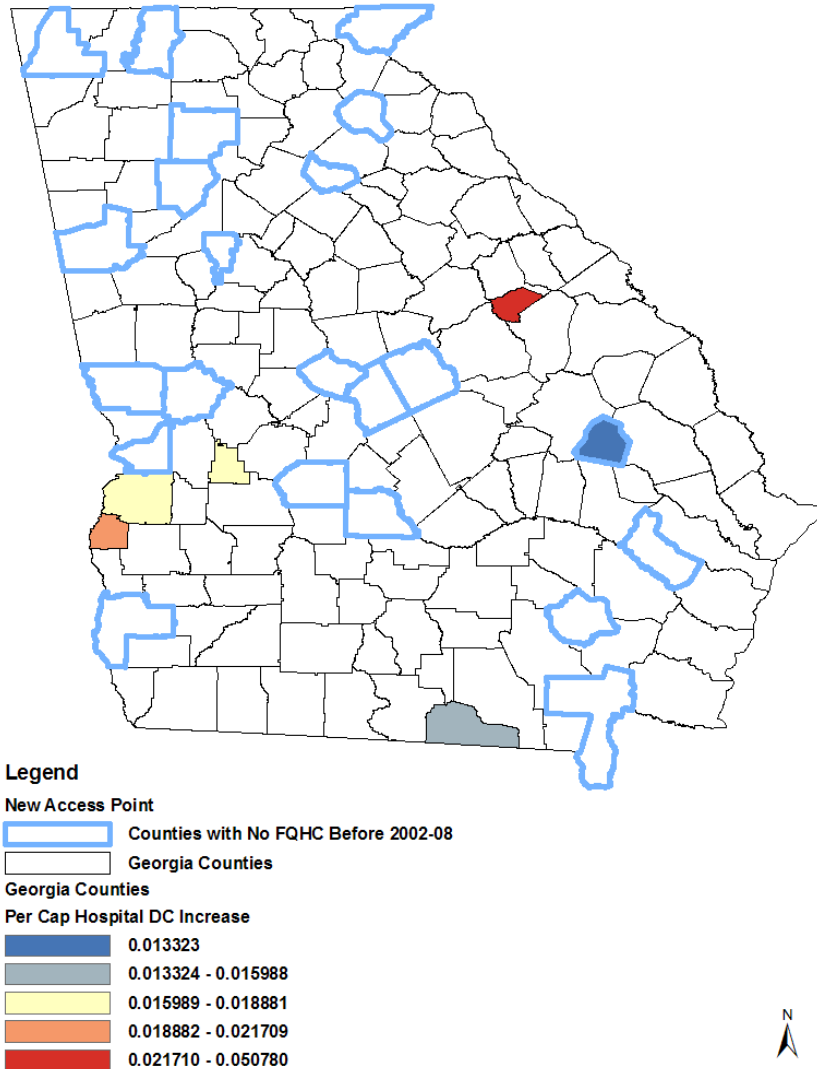


Figure 34 shows increases in hospital discharges occurred in six counties, one of which (Candler County) was a new FQHC county. Its FQHC was established in 2008, the last year of the study period.

Table 14 provides a summary of counties with significant differences in ED discharges to support the interpretation of the map.

Table 14

Range of ED Discharge Decreases by County

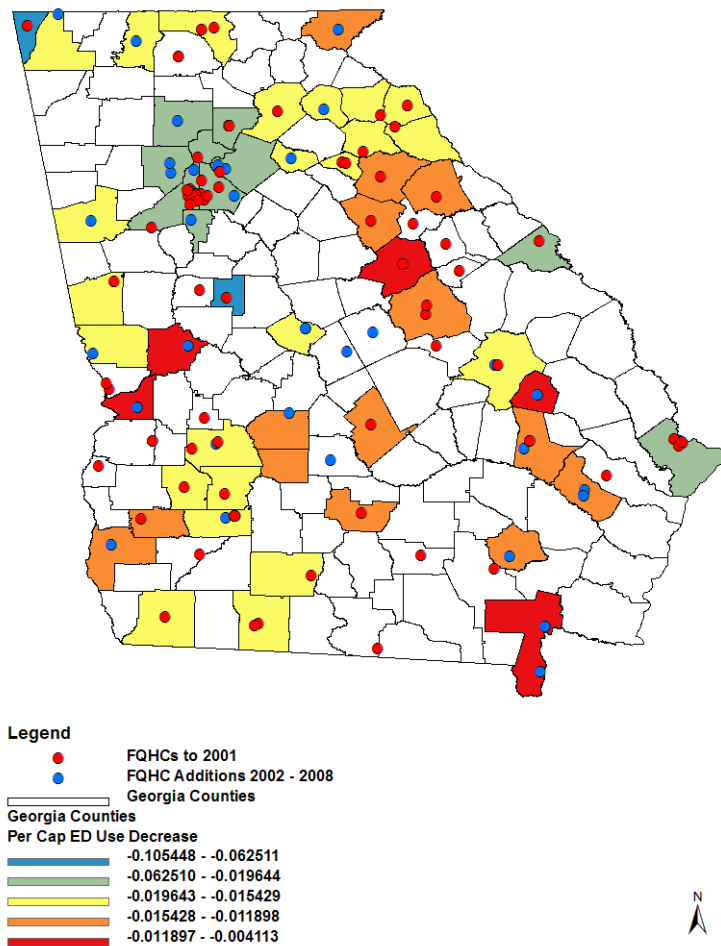
Range of ED Use Decrease Ascending order	Counties *denotes rural county; denotes new FQHC county site	
-0.0041 to -0.0126	Calhoun* Candler* Charlton* Chattahoochee*	Hancock* Talbot* Washington*
-0.0127 to -0.0154	Crisp* Dodge* Dooly* Early* Greene* Irwin* Long *	Oglethorpe* Pierce* Tattnall* Rabun* Sumter* Wilkes*
-0.0156 to -0.0196	Banks* Barrow Bibb Carroll Chatham Colquitt Clarke Decatur* Dougherty Elbert* Emanuel* Fannin*	Forsyth Franklin* Hall Harris* Hart* Lee* Madison* Murray Terrell* Thomas Troup Walker
-0.0206 to -0.1054	Cherokee Clayton Cobb Dade* DeKalb	Fulton Lamar* Richmond Gwinnett

Table 14 lists counties that showed significant decreases in ED discharges where FQHCs were present. Of these counties, 16 were first time FQHC counties. Eight of these counties with greatest decreases were non-rural and 2 were rural. Of all counties

showing decreases, 33 were rural and 20 were non-rural. All counties with the least decrease were rural (see 1st row of Table 14). This supports the mean ED use depicted in Figure 8 that indicated consistently higher ED rates among rural residents.

Figure 35

Significant Per Capita Decrease ED Discharges

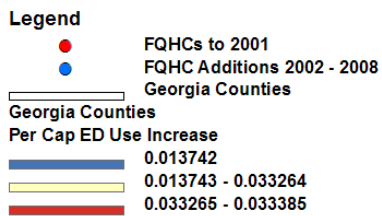
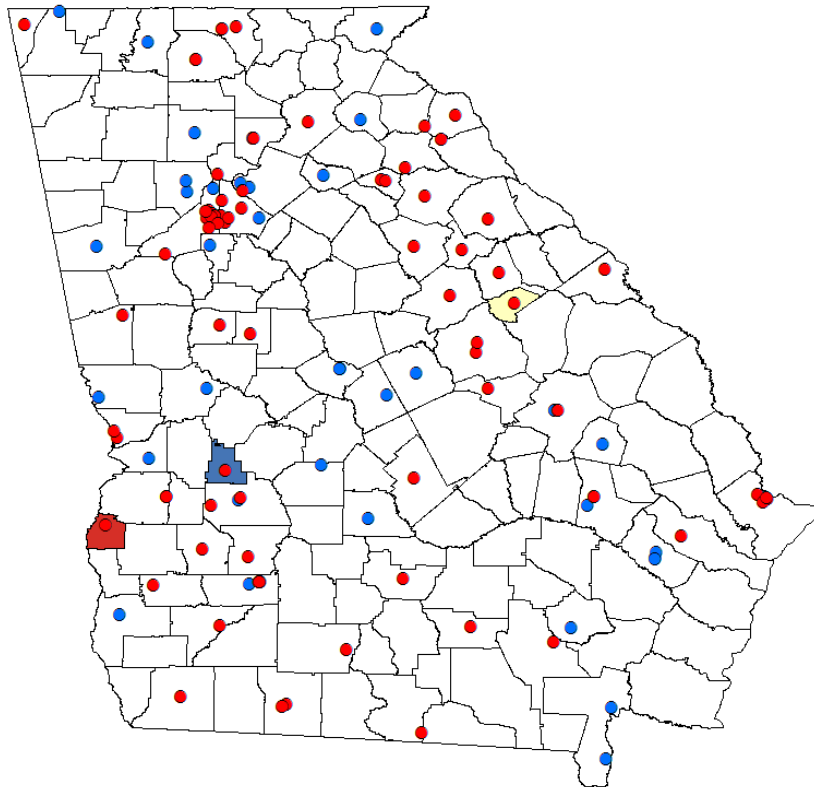


The Atlanta metropolitan area showed a cluster of ED decreases between 1.9 to 6.3 per 100 population. Decreases in ED use ranged from 0.004 to 0.105 per capita.

Only 4 counties were in the lowest decrease category of up to 1.2 per 100 people. Essentially, on less person per 100 visited the ED during the study period at worst. At best, in 2 counties, up to 10.5 ED visits occurred. The counties with the 2 greatest decreases represented those with FQHCs prior to the study period. The lowest decreases were in counties with new access points.

Figure 36

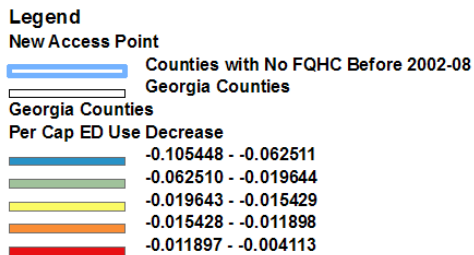
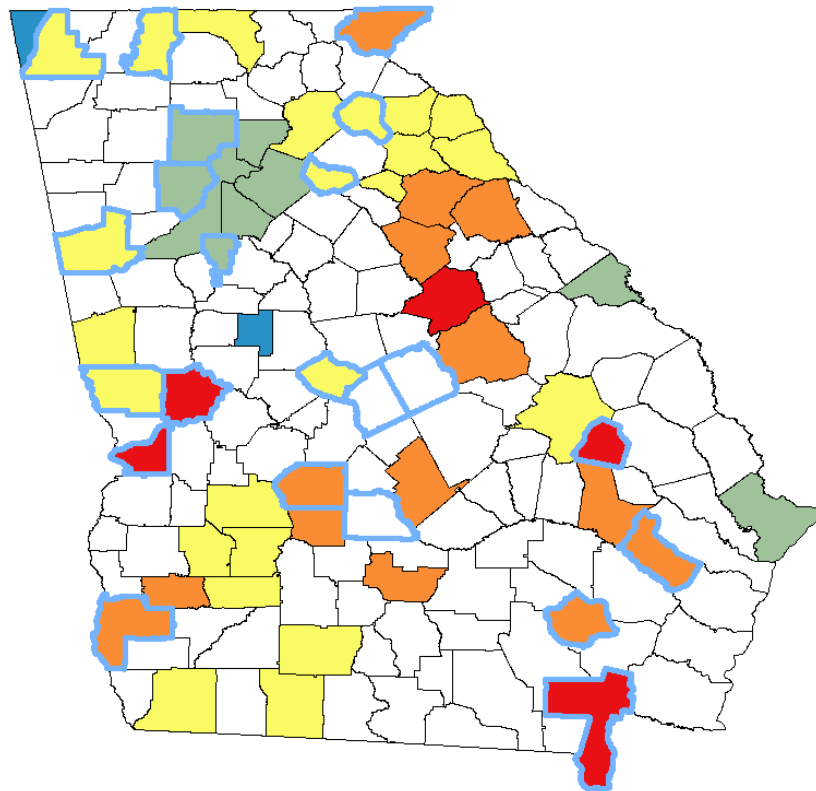
Significant Per Capita Increase in ED Discharges



Three counties showed ED increases: Schley at 0.0134, Glascock at 0.0333, and Quitman at 0.0334, all of which are rural counties. Three counties did show increases in ED use, none of which were new FQHC addition counties. All had FQHCs present before the study period (see Figure 38).

Figure 37

Per Capita Decrease in ED Use: Counties with No Previous FQHC



Of the first time FQHC counties, only three counties did not show decreases in per capita ED discharges: Twiggs, Wilkinson, and Wilcox did not indicate a decrease, but all three counties only gained FQHCs until 2008; the end of the study period (Figure 37). Twelve counties with first time FQHCs were in the 0.012 to 0.063 (or 1.2 to 6.3 per 100) range and 4 counties in the 0.004 to 0.011 range. No counties with first time sites showed decreases in the largest per capita rate change of 0.105. Multiple years of FQHC service may be necessary to see greater changes.

Figure 38

Per Capita Increases for ED Discharges

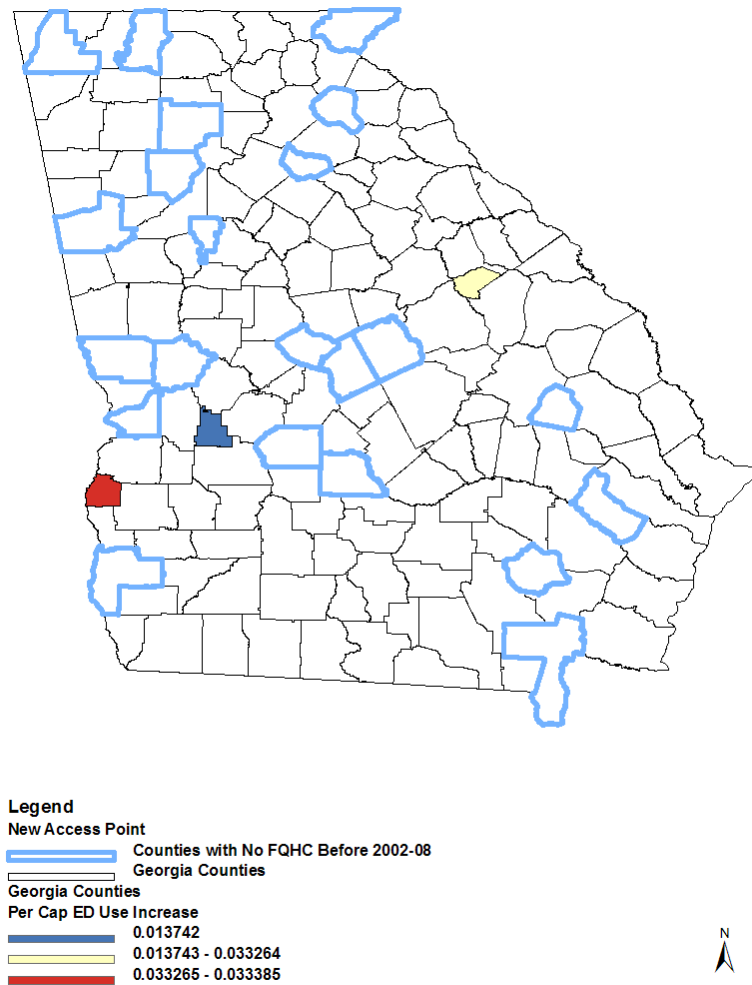


Figure 38 shows counties increases in ED discharges, none of which were first time FQHC counties. These same counties also showed increases in hospitalization (see Figure 34); were Quitman, Schley, and Glascock.

CHAPTER 5

DISCUSSION AND CONCLUSIONS

Introduction

Mean hospital and emergency department discharges for seven years spanning 2002 to 2008 were evaluated in the context of federally qualified health center (FQHC) additions during the same period to determine the effects FQHCs may have had on these discharge rates. Sample sizes were large and findings indicated that per capita hospital and emergency department rates varied according to variables of age-group, race group, and payer type with no significant variation for gender; however, effects were minimal among the significantly varied groups. Per capita differences by control variables were statistically analyzed, but trends were more easily discernible in graphic form, particularly for visualizing trends. Discussion follows for each variable with some further discussion about possible factors that may have played a role in the trends noted earlier.

Summary of Findings

Summary statistics indicated several notable characteristics. Beginning in 2006, the rate of increase in ED discharges was steep and continued to the end of the study period to 2008 and hospital discharges increased from 2005 to 2007. Per capita hospital discharge rates increased from 2006 to 2008 while ED discharges appeared much more consistent from 2006 to 2008. The highest ranking hospital payer type was private insurance followed by Medicare then self-pay, and for ED discharges, the highest ranking payer type was private insurance followed self-pay then Medicaid. During the study period, counties with no FQHC present maintained higher mean hospital and ED discharges until 2008 when FQHC present county rates exceeded counties with no FQHC

present. Rural counties had consistently higher hospital and ED discharges through all years under study. Another noteworthy point was that the per capita rate among the Other race group at 4 per 100 for both hospital and ED discharges, higher than White or Black groups. Lastly, hospital discharges were higher for the older age cohort (45-64 years) every year except 2008 when both age-groups were the same, which was not anticipated because it seemed logical that the older cohort would naturally have higher rates. Another finding was not anticipated was that hospitalizations and ED visits for Grand mal seizures substantially from 2006 to 2008 (Tables 8 and 9).

Decreases in hospital and emergency department discharges were significantly varied for most counties. Forty-one counties showed significant decreases in hospital discharges for the study period and of those, 12 were first-time FQHC sites out of a total of 22 first-time sites. Fifty-three counties showed significant ED discharge decreases during the study period and of those, 15 of the 22 first-time FQHC sites were included. During the study period there were five counties that showed statistically significant increases in per capita hospital discharges and three of those five counties were the three counties showing ED discharge increases. Among control variables, there was no significant variation by gender; however, race, age-group and payer type were significant. In the random effects model; the effect for ED discharges (r-square 0.119) was low and for hospital discharges, effect (r-square 0.08) was also low.

The consistently higher mean rural rates may be related to lower primary care access. As discussed earlier, an increase in physician supply in rural areas was suggested as a point of policy change (Laditka, 2004) based on research supporting the need for increased rural access. In a study of distance to primary care and glycemic control,

hemoglobin A1c was used as a marker of the effects of driving distance to the patient's primary care physician. After controlling for social, demographic, seasonal, and treatment variables, results showed that longer driving distances from home to the primary care site were associated with poorer glycemic control in rural areas among older adults (Strauss, MacLean, Troy, & Littenberg, 2006). This also supports the research discussed earlier that found reasonable drive times to primary care to be within a 20 minute drive on primary roads or a 30 minute drive on secondary roads. When reviewing per capita decreases in hospital discharges, the greatest decreases occurred in all non-rural counties (see Table 15). Counties with the least decrease were all rural with one exception; Colquitt County². The greatest decreases in ED discharges occurred in a mix of rural and non-rural counties; 13 rural and 20 non-rural. Of those, 10 were new FQHC addition counties.

Race differences were well depicted in graphic presentation, but also significantly varied after FQHC additions, though the effect was low. It is well known that health disparities exist and are evident by race and ethnicity (Weinick, Zuvekas, & Cohen, 2000). Cost is one reason for disparities in care, but also that disease rates are higher in minority populations may be associated with higher use of tertiary care (Laditka & Laditka, Race, 2006). Among African-Americans and Hispanics, preventable hospitalizations were high for asthma, diabetes, and hypertension, all of which are responsive to preventive interventions (Laditka & Laditka, 2006). In this study, Other

² Colquitt County appears to be rural and has a population of 45,410, a population density of 82, comparable to other rural counties.

race group was particularly high compared to White and Black groups. The Other race group definition in this study included Asian, Alaskan Native, American Indian, Native Hawaiian, Pacific Islander, and multiracial, which did not include division by Hispanic ethnicity. The Laditka (2006) study reflects White, Black, and Hispanic comparisons of hospitalization only. In a document published by the Kaiser Family Foundation, American Indians and Alaska Natives were reported as having the highest rate of many health conditions including obesity, two or more chronic conditions, and diabetes, and the rate of uninsurance was high at 1 out of 3. Also reported was the fact that coverage rates for private insurance are lower than most other racial and ethnic groups above and below the 200% federal poverty level (James, Schwartz, & Berndt, 2009).

Strengths and Limitations

Strengths in this study provided the opportunity to analyze hospital and emergency department discharge rates among a large pool of patients who utilized hospital and ED services during the 2002 to 2008 period. Analysis of multiple control variables provided some insight into the level of effect of each county's FQHC addition. Although effects were small, this knowledge is relevant in strengthening the health care safety-net because understanding which variables have less effect is as important as understanding those with the greatest effects. This study answered some questions that have not been answered in research to this date. A comparison of hospital and ED discharges by rural and non-rural counties for multiple years for all chronic ACSCs coupled with maps of rate changes following the addition of FQHCs is valuable in guiding future research. Gaining insight into the gaps in FQHC access provided support

for a continued need to review policy that drives decisions about optimal locations for health centers. Additionally, this study provided a basis for further narrowing the scope of study to gain a better understanding of realized versus potential access issues. Geographically depicting rate changes for hospital and ED discharges provided a practical view of outcomes for the study period. The lowest hospital discharge rate decreases occurred in rural areas while the greatest decreases occurred in non-rural areas, which implicate rural areas for further study to determine barriers to improvements even when FQHCs are added to rural counties.

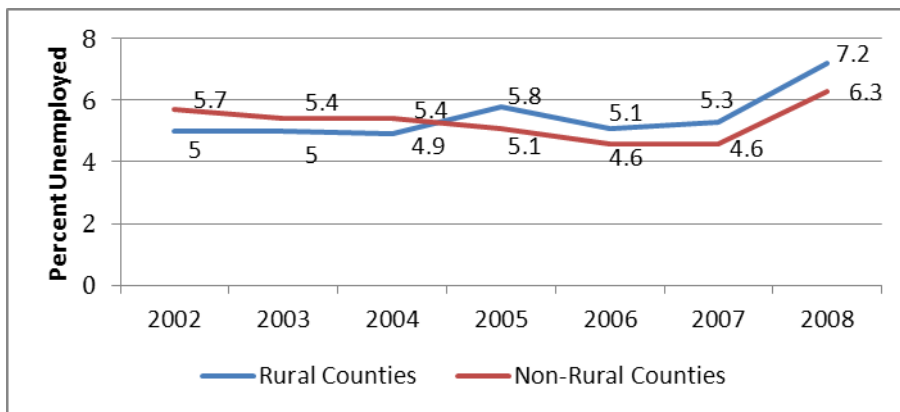
Static measures of race, sex, age, and payer type did not indicate much effect in ACSCC outcomes, though trends were noted. The Mobley Model (Figure 4) included behavior and social interactions as characteristics of potential users, and these factors may have better informed rate change differences if they had been included in this study.

The drastic changes in the economy during this period may have confounded findings. The years 2007 and 2008 corresponds to the downturn of the U.S. economy, a fact that could relate to the rate increases in hospitalization and ED visits in this study, though this is not known to be the cause of increases during 2007 and 2008. Continuing analysis of these data into future years may provide some insight, however. At the same time there were increases in hospitalizations, unemployment was also increasing substantially (see Figure 39). Figure 40 depicts increases in uninsurance rates for the years 2005 to 2008, which indicated a pattern similar to hospital discharge changes. An increase in the percentage of uninsured people was evident beginning after 2006 with steady increases to 2008, which is similar to the unemployment rates during those years, as well. The number of uninsured in the U.S. reached 46.3 million in 2008, which was an

increase of 0.6 million from 2007 and of people 18-64 years of age, 20.3% were uninsured in 2008, an increase of 19.7% from 2007 to 2008 (Davis, 2009). Also, findings showed that private insurance hospitalization payer types decreased at the same time self-pay increased for the years 2007 and 2008, which also corresponds to the increased unemployment and uninsured rates at the State and national levels.

Figure 39

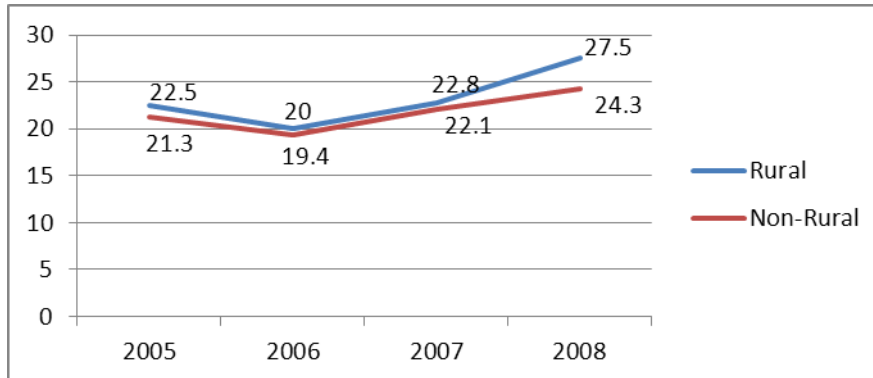
Unemployment Rates in Georgia by County: 2002-2008



Unemployment rate increases during 2007 and 2008 were in sync with increases by control variables for hospital and ED discharges, which may reflect effects of job loss, which decreases cash flow and also decreases private insurance coverage. According to the Kaiser Family Foundation, from 2008 to 2010 there was an increase in the uninsured in Georgia by 2.8%. In 2009, the adult uninsured population was 27% and in 2010, 29% (Kaiser State Health Facts, 2012).

Figure 40

Percentage of Uninsured People 18-64 Years Old by Year



(U.S. Census Bureau, 2011)

Note: Uninsured rates prior to 2006 were 2000 and 2001; no data were available for 2002 to 2004

Conclusions

Literature demonstrates that hospitalizations due to ambulatory care sensitive conditions are an indicator of quality preventive care. In order to receive quality primary care, one must have accessible care. Accessibility is dependent on policy which drives determinations about preventive care locations and ability to pay for the care. As Starfield (2006) pointed out, severity of illness is directly linked to health services. Lack of health services, then, is directly linked to outcomes such as hospital and ED discharges for conditions that should be managed in a primary care setting. Cost, quality and access are three components that impact health outcomes (Shaddox, 2005). Costs can be reduced by preventing hospital and ED discharges for ACS conditions, but to do so, quality must be maintained to ensure standards are met for managing chronic conditions. Likewise, access must be ensured to improve prevention utilization by consumers/patients. Federal, state, and local governments determine resources for health care delivery and the assurance of delivery by providing opportunities for access (Ledlow

& Coppola, 2011). Patients cannot utilize preventive care if there is no access, and they cannot reap the benefits of quality care if it is not accessible or affordable. The emergency department has been used as a safety-net since the passage of EMTALA, a law necessary to reduce refusal of care for very sick people; however, there is a double-edged sword with this law. On one hand it protected people who needed protecting by providing life-saving care, but on the other hand, it also had an unintended effect—people have used the ED because they are assured an assessment of their health state, if nothing else. Often times, however, they are so sick that they are admitted to the hospital, as well. In 2008, 51.3% of hospital admissions from the emergency department for ACSCCs occurred among people 18-64 years old. Of these, 30.4% were not in a low income category and 33.5% were suburban residents, the greatest proportion of hospital admissions from the ED (U.S. Department of Health & Human Services, Agency for Healthcare Research and Quality, 2009). If ACSCC hospitalizations are an indicator of quality preventive care and over half of hospitalizations from the ED were due to ACSCCs, clearly, quality preventive care was not utilized by this population. In 2006 and 2008, most ACSCC hospital admissions from the ED occurred in the South at 41% and 42% of all U.S. admissions, respectively; furthermore, the mean cost for hospital and ED charges for the 18-64 year group in 2006 was \$18,660 and in 2009 it was \$21,379, an increase by 12.7% in three years. Additionally, the South represented the region of the U.S. with the most hospital admissions from the ED overall at approximately 41% in 2006, 2008, and 2009. In 2009, there were nearly 550,000 hospital admissions from the ED for ACSCCs among 18-64 year olds at a mean cost of \$21,379 per case (U.S. Department of Health & Human Services, Agency for Healthcare Research and Quality,

2009). Expenditures for treatment of chronic diseases in 2003 was \$277 billion and an economic study indicated that Georgia could reduce spending for chronic conditions by 26.9% by 2023 if the 2003 current trends were reversed (DeVol & Bedroussian, 2007). Reducing this burden requires improving access by increasing geographic accessibility to care that is affordable and addressing barriers to utilizing primary care. Increasing FQHC accessibility is one method to achieve this. Part of achieving success in increasing use of quality primary care is to ensure that hours of operation are flexible for hourly wage employees, that wait times are reasonable, and the locations are within reasonable travel times.

The control variables used in this study did not link to access issues in terms of direct measures of access, both geographically and financially; however, they do indicate vulnerability that reduces access. As Probst, et al. (2003) stated, ACSCCs are indicators that care was not consistent in months prior to hospitalization. The accessibility issue appears to be a common denominator with regard to avoidable hospitalization. The use of EDs indicated that patients are not accessing care and in some Georgia counties-- the numbers increased in spite of the FQHC additions. In an article about FQHCs, less than 50% of people with diabetes and slightly more than a one-third of patients with hypertension had their conditions under control in one area of Georgia, which falls below national averages (Galewitz & Monies, 2012). The authors also reported that approximately 73% of FQHCs in Georgia performed significantly below average in maintaining healthy blood sugar levels. One point that was emphasized related to Georgia having sicker patients to begin with and that private medical practices do not report quality indicators; therefore, data are missing from the pool. The fact that the

Southern region represented 41% of ED cases being admitted to the hospital indicates that people in the South are sicker—a problem that must be overcome. Bringing people into better states of health in the South may require more intensive efforts to improve preventive care access and utilization.

Suggestions for Future Research

Future research should focus on continuing investigation of ACSCC outcomes as indicated by hospital and ED discharges. Further research may shed light on other effects not measured in this study, such as behavior and social interactions. Additionally, information about potential barriers may provide meaningful information to researchers about wait times, hours of operation, co-pays, and other factors that were not included in this study. Contributors to outcomes have been well-documented, but longitudinally, outcomes as they relate to access and/or quality primary care, have not been well documented. Continuing research in this area may provide more necessary information to continue working towards the improvement hospital and ED discharges for conditions that are manageable in a less expensive primary care setting.

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APPENDIX A

FEDERALLY QUALIFIED HEALTH CENTER OVERVIEW

What is a Health Center?

For more than 40 years, HRSA-supported health centers have provided comprehensive, culturally competent, quality primary health care services to medically underserved communities and vulnerable populations.

Health centers are community-based and patient-directed organizations that serve populations with limited access to health care. These include low income populations, the uninsured, those with limited English proficiency, migrant and seasonal farmworkers, individuals and families experiencing homelessness, and those living in public housing.

Health Center Program Fundamentals

- **Located in or serve a high need community** (designated Medically Underserved Area or Population). [Find MUAs and MUPs](#)
- **Governed by a community board** composed of a majority (51% or more) of health center patients who represent the population served. [More about health center governance](#)
- **Provide comprehensive primary health care** services as well as supportive services (education, translation and transportation, etc.) that promote access to health care.
- **Provide services available to all** with fees adjusted based on ability to pay.
- **Meet other performance and accountability requirements** regarding administrative, clinical, and financial operations.

Types of Health Centers

- **Grant-Supported Federally Qualified Health Centers** are public and private non-profit health care organizations that meet certain criteria under the Medicare and Medicaid Programs (respectively, Sections 1861(aa)(4) and 1905(l)(2)(B) of the Social Security Act and receive funds under the Health Center Program (Section 330 of the Public Health Service Act).

- **Community Health Centers** serve a variety of underserved populations and areas.
- **Migrant Health Centers** serve migrant and seasonal agricultural workers
- **Healthcare for the Homeless Programs** reach out to homeless individuals and families and provide primary care and substance abuse services.
- **Public Housing Primary Care Programs** serve residents of public housing and are located in or adjacent to the communities they serve.
- **Federally Qualified Health Center Look-Alikes** are health centers that have been identified by HRSA and certified by the Centers for Medicare and Medicaid Services as meeting the definition of “health center” under Section 330 of the PHS Act, although they do not receive grant funding under Section 330.
- **Outpatient health programs/facilities operated by tribal organizations** (under the Indian Self-Determination Act, P.L. 96-638) or urban Indian organizations (under the Indian Health Care Improvement Act, P.L. 94-437).

Source: The U.S. Department of Health and Human Services, Health Resources and Services Administration, <http://bphc.hrsa.gov/about/index.html>.

Program Requirements

Health centers are non-profit private or public entities that serve designated medically underserved populations/areas or special medically underserved populations comprised of migrant and seasonal farmworkers, the homeless or residents of public housing. A summary of the key health center program requirements is provided below. For additional information on these requirements, please review:

- Health Center Program Statute: [Section 330 of the Public Health Service Act \(42 U.S.C. §254b\)](#)
- Program Regulations: [42 CFR Part 51c](#) and [42 CFR Parts 56.201-56.604](#)
- Grants Regulations: [45 CFR Part 74](#)

Program Requirements

NEED

1. Needs Assessment: Health center demonstrates and documents the needs of its target population, updating its service area, when appropriate. (Section 330(k)(2) and Section 330(k)(3)(J) of the PHS Act)

SERVICES

2. Required and Additional Services: Health center provides all required primary, preventive, enabling health services and additional health services as appropriate and necessary, either directly or through established written arrangements and referrals. (Section 330(a) of the PHS Act)

Note: Health centers requesting funding to serve homeless individuals and their families must provide substance abuse services among their required services. (Section 330(h)(2) of the PHS Act)

3. Staffing Requirement: Health center maintains a core staff as necessary to carry out all required primary, preventive, enabling health services and additional health services as appropriate and necessary, either directly or through established arrangements and referrals. Staff must be appropriately licensed, credentialed, and privileged. Section 330(a)(1), (b)(1)- (2), (k)(3)(C), and (k)(3)(I) of the PHS Act)
4. Accessible Hours of Operation/Locations: Health center provides services at times and locations that assure accessibility and meet the needs of the population to be served. (Section 330(k)(3)(A) of the PHS Act)
5. After Hours Coverage: Health center provides professional coverage during hours when the center is closed. (Section 330(k)(3)(A) of the PHS Act)
6. Hospital Admitting Privileges and Continuum of Care: Health center physicians have admitting privileges at one or more referral hospitals, or other such arrangement to ensure continuity of care. In cases where hospital arrangements (including admitting privileges and membership) are not possible, health center must firmly establish arrangements for hospitalization, discharge planning, and patient tracking. (Section 330(k)(3)(L) of the PHS Act)
7. Sliding Fee Discounts: Health center has a system in place to determine eligibility for patient discounts adjusted on the basis of the patient's ability to pay.
 - o This system must provide a full discount to individuals and families with annual incomes at or below 100% of the Federal poverty guidelines (only nominal fees may be charged) and for those with incomes between 100% and 200% of poverty, fees must be charged in accordance with a sliding discount policy based on family size and income.*

- No discounts may be provided to patients with incomes over 200 % of the Federal poverty guidelines.*
(Section 330(k)(3)(G) of the PHS Act and 42 CFR Part 51c.303(f))
8. Quality Improvement/Assurance Plan: Health center has an ongoing Quality Improvement/Quality Assurance (QI/QA) program that includes clinical services and management, and that maintains the confidentiality of patient records. The QI/QA program must include:
- a clinical director whose focus of responsibility is to support the quality improvement/assurance program and the provision of high quality patient care;*
 - periodic assessment of the appropriateness of the utilization of services and the quality of services provided or proposed to be provided to individuals served by the health center; and such assessments shall: *
 - be conducted by physicians or by other licensed health professionals under the supervision of physicians;*
 - be based on the systematic collection and evaluation of patient records;*
 - and
 - identify and document the necessity for change in the provision of services by the health center and result in the institution of such change, where indicated* (Section 330(k)(3)(C) of the PHS Act, 45 CFR Part 74.25 (c)(2), (3) and 42 CFR Part 51c.303(c)(1-2))

MANAGEMENT AND FINANCE

9. Key Management Staff: Health center maintains a fully staffed health center management team as appropriate for the size and needs of the center. Prior review by HRSA of final candidates for Project Director/Executive Director/CEO position is required. (Section 330(k)(3)(H)(ii) of the PHS Act and 45 CFR Part 74.25 (c)(2), (3))
10. Contractual/Affiliation Agreements: Health center exercises appropriate oversight and authority over all contracted services, including assuring that any subrecipient(s) meets Health Center program requirements. (Section 330(k)(3)(I)(ii), 42 CFR Part 51c.303(n), (t)), Section 1861(aa)(4) and Section 1905(l)(2)(B) of the Social Security Act, and 45 CFR Part 74.1(a) (2))
11. Collaborative Relationships: Health center makes effort to establish and maintain collaborative relationships with other health care providers, including other health centers, in the service area of the center. The health center secures letter(s) of support from existing Federally Qualified Health Center(s) in the service area or provides an explanation for why such letter(s) of support cannot be obtained. (Section 330(k)(3)(B) of the PHS Act)

12. **Financial Management and Control Policies:** Health center maintains accounting and internal control systems appropriate to the size and complexity of the organization reflecting Generally Accepted Accounting Principles (GAAP) and separates functions appropriate to organizational size to safeguard assets and maintain financial stability. Health center assures an annual independent financial audit is performed in accordance with Federal audit requirements, including submission of a corrective action plan addressing all findings, questioned costs, reportable conditions, and material weaknesses cited in the Audit Report. (Section 330(k)(3)(D), Section 330(q) of the PHS Act and 45 CFR Parts 74.14, 74.21 and 74.26)
13. **Billing and Collections:** Health center has systems in place to maximize collections and reimbursement for its costs in providing health services, including written billing, credit and collection policies and procedures. (Section 330(k)(3)(F) and (G) of the PHS Act)
14. **Budget:** Health center has developed a budget that reflects the costs of operations, expenses, and revenues (including the Federal grant) necessary to accomplish the service delivery plan, including the number of patients to be served. (Section 330(k)(3)(D), Section 330(k)(3)(I)(i), and 45 CFR Part 74.25)
15. **Program Data Reporting Systems:** Health center has systems which accurately collect and organize data for program reporting and which support management decision making. (Section 330(k)(3)(I)(ii) of the PHS Act)
16. **Scope of Project:** Health center maintains its funded scope of project (sites, services, service area, target population, and providers), including any increases based on recent grant awards. (45 CFR Part 74.25)

GOVERNANCE

17. **Board Authority:** Health center governing board maintains appropriate authority to oversee the operations of the center, including:
 - o holding monthly meetings;
 - o approval of the health center grant application and budget;
 - o selection/dismissal and performance evaluation of the health center CEO;
 - o selection of services to be provided and the health center hours of operations;
 - o measuring and evaluating the organization's progress in meeting its annual and long-term programmatic and financial goals and developing plans for the long-range viability of the organization by engaging in strategic planning, ongoing review of the organization's mission and bylaws, evaluating patient satisfaction, and monitoring organizational assets and performance;* and
 - o establishment of general policies for the health center.
(Section 330(k)(3)(H) of the PHS Act and 42 CFR Part 51c.304)

Note: In the case of public centers (also referred to as public entities) with co-applicant governing boards, the public center is permitted to retain authority for establishing general policies (fiscal and personnel policies) for the health center. (Section 330(k)(3)(H) of the PHS Act and 42 CFR 51c.304(d)(iii) and (iv))

Note: Upon a showing of good cause the Secretary may waive, for the length of the project period, the monthly meeting requirement in the case of a health center that receives a grant pursuant to subsection (g), (h), (i), or (p). (Section 330(k)(3)(H) of the PHS Act)

18. Board Composition: The health center governing board is composed of individuals, a majority of whom are being served by the center and, who as a group, represent the individuals being served by the center in terms of demographic factors such as race, ethnicity, and gender. Specifically:

- Governing board has at least 9 but no more than 25 members, as appropriate for the complexity of the organization.*
- The remaining non-consumer members of the board shall be representative of the community in which the center's service area is located and shall be selected for their expertise in community affairs, local government, finance and banking, legal affairs, trade unions, and other commercial and industrial concerns, or social service agencies within the community.*
- No more than one half (50%) of the non-consumer board members may derive more than 10% of their annual income from the health care industry.*

Note: Upon a showing of good cause the Secretary may waive, for the length of the project period, the patient majority requirement in the case of a health center that receives a grant pursuant to subsection (g), (h), (i), or (p).

(Section 330(k)(3)(H) of the PHS Act and 42 CFR Part 51c.304)

19. Conflict of Interest Policy: Health center bylaws or written corporate board approved policy include provisions that prohibit conflict of interest by board members, employees, consultants and those who furnish goods or services to the health center.

- No board member shall be an employee of the health center or an immediate family member of an employee. The Chief Executive may serve only as a non-voting ex-officio member of the board.*

(45 CFR Part 74.42 and 42 CFR Part 51c.304(b))

Source: The U.S. Department of Health and Human Services, Health Resources and Services Administration, Primary Care; The Health Center Program retrieved on April 19, 2012 from <http://bphc.hrsa.gov/about/requirements/index.html#services1>.

APPENDIX B

GEORGIA DATA POLICY USE FORM

Georgia Department of Community Health – Division of Public Health (GDCH-DPH) Data Use Policy and Form

Part A: Protected Health Information

THE INFORMATION YOU ARE REQUESTING IS CONSIDERED PROTECTED HEALTH INFORMATION IN THAT IT CONTAINS PERSONALLY IDENTIFIABLE DATA. PERSONAL IDENTIFIERS INCLUDE BUT ARE NOT LIMITED TO: NAMES, RESIDENTIAL ADDRESSES AND RESIDENTIAL ZIPCODES. SOCIAL SECURITY NUMBERS ARE NOT INCLUDED ON BIRTH FILES. THE USER WILL ACKNOWLEDGE THAT OTHER DATA FIELDS MAY CONSTITUTE PROTECTED HEALTH INFORMATION, GIVEN THE DEFINITION BELOW:

“Protected health information means any information, whether oral, written, electronic, visual, pictorial, physical, or any other form, that relates to an individual’s past, present, or future physical or mental health status, condition, treatment, service, products purchased, or provision of care, and which (a) reveals the identity of the individual whose health care is the subject of the information, or (b) where there is a reasonable basis to believe such information could be utilized (either alone or with other information that is, or should reasonably be known to be, available to predictable recipients of such information) to reveal the identity of that individual.”

“For example, if a health record contains sufficient information to identify an individual to whom it relates because it provides information which specifically narrows the class of individuals in an aggregate setting (such as an HIV report that contains the race, gender, age, county of residence, date of infection, place of treatment, or other information about an individual in a rural community with limited cases of HIV infection), such record may also be considered identifiable in its existing form, and thus protected health information.”

IF THIS PROTECTED HEALTH INFORMATION IS USED TO IDENTIFY INDIVIDUALS, THE USER SHALL BE AWARE OF THE FOLLOWING TERMS AND REQUIREMENTS FOR USE:

- **Use** means to employ or utilize all or any part of any protected health information for a legitimate public health purpose. Public health agencies are allowed to use protected health information for legitimate public health purposes with minimal

restrictions. Uses of such information include transferring information within or among public health agencies that have the authority to acquire the information. Uses do not include disclosing such information to any person outside a public health agency.

- **Legitimate public health purpose** means a population-based activity or individual effort primarily aimed at the prevention of injury, disease, or premature mortality, or the promotion of health in the community, including (a) assessing the health needs and status of the community through public health surveillance and epidemiological research, (b) developing public health policy, and (c) responding to public health needs and emergencies.
- **Public health official** means any officer, employee, private contractor or agent, intern, or volunteer of a public health agency with authorization from the agency or pursuant to law to acquire, use, disclose, or store protected health information.
- **Commercial Uses:** Protected health information shall not be used by a public health agency or public health official for commercial purposes.
- **Deceased Individuals:** Generally, nothing shall prohibit the disclosure of protected health information in a certificate of death, autopsy report, or related documents prepared under applicable laws or regulations.
- **Social Security Numbers.** Not available except on death certificates in approved cases.

THE FOLLOWING REQUIREMENTS FOR USES CONSISTENT WITH ORIGINAL LEGITIMATE PUBLIC HEALTH PURPOSES APPLY:

[a] In General. Protected health information shall be used by a public health agency solely for legitimate public health purposes that are directly related to the purpose for which the information was acquired. Providing access to protected health information to any person other than a public health agency or public health official is not a use;

[b] Subsequent Uses. A public health agency may use protected health information for legitimate public health purposes that are not directly related to the original purpose for which the information was acquired only if: The agency's subsequent use relates directly to a legitimate public health purpose; the use is reasonably likely to achieve such purpose, and the purpose cannot otherwise be achieved as well or better with non-identifiable information.

[c] Research Use. A public health agency or official may use protected health information for public health, epidemiological, medical, or health services research provided that:

- (1) it is not feasible to obtain the informed consent of the individual who is the subject of the information;
 - (2) identifiable information is necessary for the effectiveness of the research project;
 - (3) the minimum amount of information necessary to conduct the research is used;
 - (4) the research utilizing the protected health information will likely contribute to achieving a legitimate public health purpose; and
 - (5) the information is made non-identifiable at the earliest opportunity consistent with the purposes of the research project and expunged after the conclusion of the project.

IN ADDITION, YOU HAVE THE DUTY TO ADHERE TO THE
FOLLOWING IN ORDER TO HOLD INFORMATION
SECURE:

[a] Generally. Public health agencies have a duty to acquire, use, and store protected health information in a confidential manner which safeguards the security of the information.

[b] Security Measures. Public health agencies and other persons who are the recipients of protected health information disclosed by any agency, other than the individual (or the individual's lawful representative) who is the subject of the information, shall take appropriate measures to protect the security of such information, including:

- (1) maintaining such information in a physically secure environment, including:
 - [i] limiting the number of physical places in which such information is used or stored; and
 - [ii] prohibiting the use or storage of such information in places where the security of the information may likely be breached or is otherwise significantly threatened;
- (2) maintaining such information in a technologically secure environment;
- (3) identifying and limiting the persons having access to such information to those who have a demonstrable need to access such information;
 - (4) reducing the length of time that such information is used or stored in a personally-identifiable form to that period of time which is necessary for the use of the information;

- (5) eliminating unnecessary physical or electronic transfers of such information;
- (6) expunging duplicate, unnecessary copies of such information;
- (7) assigning personal responsibility to persons who acquire, use, disclose, or store such information for preserving its security;
- (8) providing initial and periodic security training of all persons who acquire, use, disclose, or store such information;
 - (9) thoroughly investigating any potential or actual breaches of security concerning such information; and
 - (10) undertaking continuous review and assessment of security standards.

IF A RECIPIENT OF THESE DATA: BY YOUR SIGNATURE ON THE LAST PAGE, YOU ACKNOWLEDGE THAT YOU UNDERSTAND ALL PRECEDING ITEMS AND THE FOLLOWING STATEMENT, AND AGREE TO USE THE DATA ACCORDINGLY.

"Protected health information contains health-related information about individuals which may be highly-sensitive. This information is entitled to significant privacy protections under federal and state law. The disclosure of this information outside public health agencies in an identifiable form is prohibited without the written consent of the person who is the subject of the information, unless specifically permitted by federal or state law. Unauthorized disclosures of this information may result in significant criminal or civil penalties, including imprisonment and monetary damages."*

Adapted from the Model State Public Health Privacy Act, August 12, 1999.

LAWRENCE O. GOSTIN, JD, LLD (HON), Georgetown University Law Center, Washington, DC.

** per Health Insurance Portability and Accountability Act of 1996*

Part B: Data Use Policy (Created 2.22.02 (revised 1.5.11))

The intent of this policy is to assure the availability of Georgia data to public health researchers for the benefit of Georgia citizens while safeguarding its confidentiality. The policy is to serve the needs of the citizens, the agency and the researcher. The policy will improve communication and coordination by outlining major steps related to release of data as well as to publication and dissemination of the data.

The elements for this policy are:

- All requests for data should be project-specific rather than a blanket request for data, e.g., “birth certificate data for all births between 1996 and 2000.” A blanket request for data should be considered only if
 - 1) a series of beneficial analyses and/projects are proposed,
 - 2) it is mutually beneficial and in the best interest of both parties, and
 - 3) special procedures are developed to safeguard everyone’s interest and concerns.
- All requests should be accompanied by a one-page proposal outlining the **objectives, design and analysis of the research, safeguards for assuring the confidentiality of the data, and steps to return or destroy the original and subsequently created data sets**. Assurances of confidentiality and ultimate elimination of the data are the responsibility of the requesting agency and assurances are to be provided by that agency. For those investigators who may have prior access to the data from another project, no work on any new project of any kind may be performed without prior approval. The Division of Public Health (hereafter, “The Division”) will attempt to approve all projects within three weeks, but provision of new data sets may take a substantially longer time.
- Before release of the data, the researcher(s) and the Division should discuss and agree upon authorship and responsibilities of authorship. The primary author should sign this authorship agreement that includes authorship, role of authors, rules of communication and other essentials.
- All data released outside the Division should be de-identified or have received **IRB approval** from the Division. IRB approval/exemption through the requesting agency or other IRB agreed to by the Division will greatly expedite the approval process, and may waive the need for Georgia Department of Community Health IRB application. For policies, procedures and forms visit

http://www.odis.dhr.state.ga.us/7000_reg/regulatory.htm

- Before submission for publication or other distribution, the Division shall receive a **copy for review and comment**. The Division must be given at least three weeks for comment. If a CDC author, this process should occur before submission for CDC clearance.
- After project completion, the researcher(s) agree to at least one presentation of the data to interested people at the Division before publication.
- Depending on the nature of the project proposed, the Division may request additional services of the investigator to assure program benefit to the Division. The Division will make such requests in advance before approval of the request to receive data.

Part C: Data Use Form: Protected Health Information for a Public Health Purpose by Non-DCH Employees.

YOUR DATA REQUEST: Please complete all of the following areas (additional pages may be attached).

Purpose of data request and objectives for use:

The literature states that ACSC discharges and emergency room use are indicators of delaying use of primary care—that certain conditions (ACSCs) that result in a hospitalization are indicators of poor use of primary care. Likewise, ER use for the same conditions is also an indicator that patients are using emergency rooms (ERs) for their primary care needs.

Towards the completion of my dissertation, I am seeking data for emergency room visits for conditions otherwise known as ambulatory care sensitive conditions for chronic diseases (see list below) to analyze the ER use counts/rates and compare them by county, and rural-urban status.

Design and analysis of the research:

Data will be analyzed by county, and likely aggregated to wider boundaries (rural and urban categories). An analysis of emergency department counts/rates will be conducted to determine vulnerable areas for using the ER as a primary care source for chronic disease conditions that should be treated in a primary care setting. Although ACSC data are available for hospital discharges, it would be beneficial to count those who are also seeking care in an ER setting. This information would further inform areas of need in Georgia (for the dissertation).

LIST OF DATA ITEMS (fields, variables). Provide a detailed description of data requested (include geographic area (geographic unit of analysis), and whether by residence or occurrence; time period; age; race; and for any other criteria, please list the specific variables).

Geographic Unit of Analysis (Where and what units). <i>By County for the State of Georgia (N=159)</i>		Analysis by: X Residence (at the county level) X Occurrence <input type="checkbox"/> Both		
Time Period <i>e.g. 2002-latest year</i>	Ages <i>e.g. adults 18+</i>	Check if data by Gender are requested X	Race group(s) White, AA or Black, all other race groups	Check if data by Ethnicity are requested X
List ALL additional Data Items				

Emergency room visits for chronic conditions as follows:	
Angina [411.1, 411.8, 413]	
Asthma [493]	
Chronic Obstructive Pulmonary Disease [466.0*, 491, 492, 494, 496]	*Includes acute bronchitis {466.0} only with secondary diagnosis of 491, 492, 494, 496
Congestive Heart Failure [402.01, 402.11, 402.91, 428, 518.4]	
Diabetes with ketoacidosis or hyperosmolar coma or other coma [250.1-250.33]	
Diabetes with other specified or unspecified complications [250.8-250.93]	
Diabetes mellitus without mention of complications or unspecified hypoglycemia [250-250.04]	
Grand Mal & Other Epileptic Conditions [345]	
Hypertension [401.0, 401.9, 402.00, 402.10, 402.90]	
Tuberculosis (Non-Pulmonary) [012-018]	
Pulmonary Tuberculosis [011]	

PROTECTED HEALTH INFORMATION (PHI): List each PHI data item and justify the use for each item, stating how each item is used to achieve the purpose of your study. Requests for PHI items will not be processed without specific justification for inclusion. Protected Health Information items include, but are not limited to: names, dates of birth, certificate numbers, addresses and potentially geographic units smaller than County.

PHI Data Items	Intended Use or Reason for this data item (be specific)

Safeguards for assuring the confidentiality of the data:

I am requesting data at the county level; therefore, I will not be aware of individual data. I will conform to all principles to preserve privacy.

Steps to return or destroy the original and subsequently created data sets:

If return of data is required, I will do so at the completion of my dissertation.

PLEASE ACKNOWLEDGE EACH BELOW by checking the appropriate box:	Yes	No
Is IRB Approval required? If yes, please send a copy.		X
We agree to adhere to the policies and procedures set forth in Part A: Protected Health Information and in Part B: Data Use Policy.	X	
We acknowledge that these data can not be used outside the scope presented within this document.	X	
We agree to acknowledge the “Georgia Division of Public Health, Office of Health Indicators for Planning (OHIP)” in all literary works and presentations using the requested data	X	
Any publications/presentations will be sent to the Division for review prior to publication:	X	

This signed form is not perpetual and a new form must be signed for each request or use of data unless otherwise approved in writing.



October 4, 2011

Signature (electronic acceptable)

Date

Mary W. Mathis

Print Name

Doctoral candidate

Title

Georgia Southern University, Jiann Ping-Hsu College of Public Health

Organization

===== below for internal use =====

Description of data released:

Email form to ohip@dhr.state.ga.us or fax to (404) 656-9880

APPENDIX C

INSTITUTIONAL REVIEW BOARD APPROVAL

Georgia Southern University Office of Research Services & Sponsored Programs Institutional Review Board (IRB)		
Phone: 912-478-0843		Veazey Hall 2021 P.O. Box 8005 Statesboro, GA 30460
Fax: 912-478-0719	IRB@GeorgiaSouthern.edu	

To: Mary Mathis
Dr. Hani Samawi

cc: Charles E. Patterson
Vice President for Research and Dean of the Graduate College

From: Office of Research Services and Sponsored Programs
Administrative Support Office for Research Oversight Committees
(IACUC/IBC/IRB)

Date: 12/19/11

Initial Approval Date: 12/19/11

Expiration Date: 04/30/12

Subject: Status of Application for Approval to Utilize Human Subjects in Research

After a review of your proposed research project numbered **H12151** and titled "**An Investigation of Associations with Hospital Discharge Rates and Emergency Department Use Rates for Ambulatory Care Sensitive Chronic Conditions: Accessibility to Federally Qualified Health Centers.**" it appears that your research involves activities that do not require full approval by the Institutional Review Board according to federal guidelines.

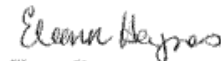
According to the Code of Federal Regulations Title 45 Part 46, your research protocol is determined to be exempt from full review under the following exemption category(s):

- B4 Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

Therefore, as authorized in the Federal Policy for the Protection of Human Subjects, I am pleased to notify you that your research is exempt from IRB approval. You may proceed with the proposed research.

Please notify the IRB when you have completed the project by emailing irb@georgiasouthern.edu. Include the date of completion, the number of subjects (records) utilized and if there were any unexpected events related to the subjects during the project. (If none, state no unexpected or adverse events occurred during the conduct of the research.)

Sincerely,



Eleanor Haynes
Compliance Officer

APPENDIX D

INSTITUTIONAL REVIEW BOARD APPROVAL RENEWAL

Georgia Southern University Office of Research Services & Sponsored Programs Institutional Review Board (IRB)		
Phone: 912-478-0843		Veazey Hall 2021
Fax: 912-478-0719	IRB@GeorgiaSouthern.edu	P.O. Box 8005 Statesboro, GA 30460

To: Mary Mathis
Dr. Hani Samawi

cc: Charles E. Patterson
Vice President for Research and Dean of the Graduate College

From: Office of Research Services and Sponsored Programs
Administrative Support Office for Research Oversight Committees
(IACUC/IBC/IRB)

Date: 03/21/12

**Initial Approval
Date:** 12/19/11

**Expiration
Date:** 03/21/12

Subject: Status of Renewal Application for Approval to Utilize Human Subjects in
Research

After a review of you extension request for research project numbered **H12151** and titled "**An Investigation of Associations with Hospital Discharge Rates and Emergency Department Use Rates for Ambulatory Care Sensitive Chronic Conditions: Accessibility to Federally Qualified Health Centers.**" it appears that your research involves activities ...

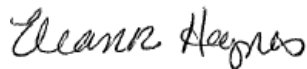
...remain unchanged and approval will be extended for an additional 12 month approval period.

According to the Code of Federal Regulations Title 45 Part 46, your research protocol is determined to be exempt under the following exemption category(s):

- B4 Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

Therefore, as authorized in the Federal Policy for the Protection of Human Subjects, I am pleased to notify you that your research is exempt from IRB approval. You may proceed with the proposed research.

Sincerely,



Eleanor Haynes
Compliance Officer