



**EVALUATION OF COMMUNITY CARE OF NORTH
CAROLINA ASTHMA AND DIABETES
MANAGEMENT INITIATIVES: JANUARY 2000-
DECEMBER 2002**

North Carolina Rural Health Research and Policy Analysis Program

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April 15, 2004

This paper is submitted to fulfill a task under a Contract Agreement with the
Foundation for Advanced Health Programs, Inc.
311 Ashe Ave.
Raleigh, NC 27606

UNC Contract Reference 5-35174

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EXECUTIVE SUMMARY

In 1998, the North Carolina Division of Medical Assistance (DMA), the State's Medicaid Agency, created and implemented a program of community-based medical care management, currently called Community Care of North Carolina (CCNC), but previously known as Access II and III. This program was an outgrowth of the state's traditional primary care case management (PCCM) program, called Carolina ACCESS, which started in 1991. The central philosophy of the CCNC is to develop local networks of primary care providers to coordinate prevention, treatment, referral and institutional services for Medicaid beneficiaries.

In December of 2002, there were twelve projects in the CCNC program, including eleven local (individual county or multiple contiguous counties) systems, and one statewide network of primarily pediatric practices in 33 counties. Those twelve networks incorporated some 246 providers/practices that were responsible for 252,190 Medicaid beneficiaries. From January 2000 through December 2002, CCNC enrollment grew by 52.1% while the ACCESS program grew only 12.5%.

In 2002, the NC General Assembly legislated statewide expansion of the CCNC, and directed DMA to monitor cost savings and quality indicators for the Medicaid population enrolled in CCNC. Accordingly, the state initiated two assessments of the program. The first focused on overall CCNC program costs to DMA and the other was to focus on the effects of specific disease management efforts within CCNC. This report describes the latter assessment conducted by the Cecil G. Sheps Center for Health Services Research at the University of North Carolina at Chapel Hill. The study focuses on expenditures and utilization of services for Medicaid beneficiaries with asthma and diabetes.

The study compares the costs and utilization of Medicaid recipients diagnosed with asthma or diabetes who were enrolled in either ACCESS or CCNC. This comparison of monthly costs and yearly utilization between ACCESS and CCNC was conducted using Medicaid claims and enrollment data furnished by the Division of Medical Assistance. Staff of DMA identified all Medicaid beneficiaries that met the criteria for asthma or diabetes between January 1, 2000 and December 31, 2001 using criteria developed by the DMA. The analysis looked at asthma and diabetes claims separately. Claims were included in each disease specific analysis beginning the month after the enrollee met the criteria for inclusion in the disease initiative. Enrollees meeting the criteria for either asthma or diabetes were included in both analyses.

There were significant differences in the ages of enrollees with asthma between the CCNC and ACCESS programs. To analyze and compare the program effects for asthma, age-adjustment was used throughout. The analysis of diabetic enrollees did not require this adjustment as the age distribution was similar in the two programs.

The study found that per-member-per-month (pmpm) costs for CCNC managed patients with asthma were lower than in the ACCESS program. In CY2000, the pmpm costs for CCNC were \$16 or 2.6% less than the pmpm costs for ACCESS enrollees. This translates to an annual cost saving of \$24,480 per month and an annual total of \$293,760. In 2001, the difference increased to \$27 or 4.7%, equivalent to \$123,147 saving per month or \$1,477,764 per year. That savings

rate dropped back to \$21 pmpm in 2002, but the higher number of enrollees in CCNC yielded a higher total program savings of \$1,580,040.

In 2000, there were 23% fewer hospital admissions per 1,000 asthmatic CCNC enrollees under the age of 21 than there were for ACCESS enrollees. This relationship stayed relatively constant over the next two years with 21% fewer inpatient admissions among asthmatics enrolled in CCNC than in ACCESS in 2002. For children (birth-20 years), CCNC enrollees experienced 13% fewer asthma-related hospitalizations in 2000 than children enrolled in ACCESS, and the differential grew to 21% in 2002. Older CCNC enrollees (21 or older) experienced 9% fewer hospitalizations in 2000, but 25% fewer in 2002. The use of emergency room services (ER) has been consistently lower among CCNC children than ACCESS children, but not significantly different among adults. For example, CCNC children had a 31% lower per-enrollee rate of ER visits for any reason in 2000, and 34% fewer per-enrollee ER visits in 2002 than did ACCESS children. CCNC children had 42.5% fewer ER visits for asthma related diagnoses in 2000 than did ACCESS children, although this difference had narrowed a bit by 2002 (37.5%).

Overall, average pmpm costs for diabetics enrolled in CCNC in 2002 were \$859, as compared to \$880 for ACCESS enrollees. Based on this average \$21 pmpm difference, the savings generated by the CCNC program for the entire enrolled population is estimated to be \$306,432 on an annual basis, or \$2,083,824 over the three years. There was some variation in savings by age cohort. Among enrollees 45-64 years old, CCNC demonstrated modest savings of \$16 per person, or 1.6% over the cost of the ACCESS program. However, in the second largest age category, 21-44 year olds, the pmpm cost was \$19 higher for CCNC, for a 2.3% greater cost than the ACCESS program.

Hospital utilization was also lower for diabetic patients treated in the CCNC networks. The annual rate of hospitalization per 1,000 diabetic enrollees was lower in CCNC over all three years of the study. In 2002, the hospitalization rate for CCNC was 306 admissions per 1,000 persons, 9% lower than the corresponding rate for ACCESS enrollees. The use of prescription pharmaceuticals increased over the three years for both ACCESS and CCNC patients, though in each year the rate is lower for CCNC. In 2002 the rate for CCNC is 62 prescriptions per person for CCNC which is 8.8% fewer than the rate for enrollees in the ACCESS program.

For both asthma and diabetes care there were substantial geographic variations in costs and use rates. In a few counties, the ACCESS costs were below CCNC; however, the striking results of this geographic analysis were the very wide overall variations. For example, the average pmpm costs for diabetics over the age of 19 varied from a low of \$609 pmpm in Halifax County, to a high of \$1,160 in Surry County in 2002. For children with asthma, the average pmpm costs varied from a low of \$153 in Wilson County to a high of \$403 in Buncombe County in 2002.

This study shows that during the 2000-2002 time period, the CCNC program may have helped to reduce overall health care expenditures for individuals with asthma and diabetes treated in the program's networks of care. The savings appear to be greater for the treatment of individuals diagnosed with asthma than among those with diabetes. After adjusting for the different age distribution between ACCESS and the CCNC program, we estimate that North Carolina saved approximately \$3.3 million in the three year time period for people with asthma over what the

state would have spent if these individuals were enrolled in Carolina ACCESS. The estimated cost savings for diabetes care for the three year period totals approximately \$2.1 million. This estimate does not include the total anticipated savings if all eligible persons in all NC counties were treated in CCNC networks. The data suggest that the DMA would have saved an additional \$5.9 million in 2002 had all the ACCESS enrollees been included in CCNC networks and the patterns of average costs applied to all enrollees.

The findings suggest that expansion of the CCNC program has the potential to produce additional cost savings to the state; however, initial program savings may be difficult to realize in expansion areas across the state if the savings have been driven by unique characteristics of the providers who initially chose to participate in CCNC. Early adopters are more likely to be supportive and engaged in the disease management program; it is unclear whether CCNC can achieve cost savings in communities where provider practice style varies considerably from the early adopters. Conversely, the findings suggest that even greater cost savings may be possible if CCNC can enroll an older population; the greatest reductions in cost were realized among the older cohorts. Additionally, there is potential to reduce overall program costs by focusing on reducing expenditures in certain high cost areas of the state. For these reasons, it is important to reassess the effectiveness of the program as it is expanded statewide.

INTRODUCTION

In 1998, the North Carolina Division of Medical Assistance (Medicaid) created and implemented a program of community based care management, currently called Community Care of North Carolina (CCNC), but previously known as Access II and III. This program was an outgrowth of the state's traditional primary care case management (PCCM) program, called Carolina ACCESS, which started in 1991. The central philosophy of the CCNC is to develop local networks of primary care providers to coordinate prevention, treatment, referral and institutional services. Each network is charged with taking a population health management approach which involves identifying individuals with certain high-cost or complex health conditions in need of case management and directing resources toward their care.

The Division of Medical Assistance (DMA) and the Office of Research, Demonstrations and Rural Health Development (ORDRHD) supervise the local networks. In December of 2002, North Carolina's CCNC Network consisted of twelve projects, including eleven local (individual county or multiple contiguous counties) systems, and one statewide network of primarily pediatric practices in 33 counties. In 2002, the NC General Assembly legislated statewide expansion of the CCNC, and the General Assembly directed DMA to monitor cost savings and quality indicators for the Medicaid population enrolled in CCNC.

CCNC has matured to the point where an assessment can be made of its progress and accomplishments. This assessment, conducted by the Cecil G. Sheps Center for Health Services Research, is part of the Department's effort to monitor the program and has been developed as part of a contract with the North Carolina Foundation for Advanced Health Programs which supports the work of the ORDRHD in coordinating CCNC. ORDRHD contracted with the

Sheps Center to assess utilization and cost savings in CCNC in comparison with similar enrollees in the ACCESS program. The assessment focused on expenditures and utilization of services for Medicaid beneficiaries with asthma and diabetes.

BACKGROUND

Medicaid Case and Disease Management

While there is no single definition for disease management, it typically includes a process that identifies high risk, chronically ill patients with specific diseases or health conditions, develops treatment plans using best practices and evidence-based treatment guidelines, and provides the patients with health education and case management to help them manage their health conditions. Providers are educated and encouraged to follow certain prescribed treatment guidelines based on best practices. The care that patients receive is monitored either through medical chart review or patient encounter records submitted for reimbursement. Disease management programs often set goals targeting specific utilization or outcomes improvements (Wheatley, 2001). The rationale behind disease management is that care managers can assist chronically ill patients in adhering to their care regimens by providing education on self-care techniques and by addressing needs which may impede the patient's ability to comply with medical advice, such as mental health issues or problems with transportation, language, or housing. In turn, it is expected that patient outcomes will improve and that utilization of high cost services such as inpatient hospital care and emergency room visits will decrease.

The use of disease management, as opposed to case management, in Medicaid programs is a relatively recent phenomenon. Medicaid recipients have been enrolled in disease management through Medicaid HMOs in some states since the early 1990s. Disease management programs for Medicaid PCCM enrollees began to emerge in the late 1990s, though many were implemented only in the last two years. According to a recent Kaiser Family Foundation Report, 24 states are now operating some program of disease management for their Medicaid PCCM enrollees¹. States have focused their Medicaid diseases management initiatives to target a variety of conditions; the most common being diabetes, asthma, hemophilia, and depression (Folz, 2003). The choice of target diseases has generally been motivated by estimates of per capita or total program benefit. Asthma and diabetes initiatives can achieve considerable savings because of the vast number of people afflicted with these conditions. However, less common conditions such as hemophilia or HIV/AIDS present potential to reduce per capita spending considerably because of the high cost of treatments.

The design of Medicaid disease management programs has varied across states to include strategies of external contracting with disease management organizations as well as the establishment of local provider networks to manage the enrolled population, as in North Carolina. In some states, disease management was pilot tested in a single county, in other states the approach has been a statewide/regional program rollout. Additionally, states have differed in

¹ Kaiser Family Foundation. "Many States Saving Medicaid Funds by Using Disease Management Programs, State Officials Say." Oct 16, 2003. http://www.kaisernetwork.org/daily_reports/rep_index.cfm?hint=3&DR_ID=20390

whether enrollment is mandatory or voluntary for providers and recipients. These varied strategies have been modified and adopted by other states as they begin the process of disease management for their Medicaid population.

History of ACCESS and Community Care of North Carolina

North Carolina began Carolina ACCESS in 1991 as a primary care case management (PCCM) program under a 1915(b) waiver. The philosophy of ACCESS was to help link Medicaid recipients to a primary care physician and to create a medical home, i.e., a physician who knew the patient and could help coordinate their care and reduce program expenditures. This program was not initially designed to focus on quality improvement. The program started in five counties and by 1999 covered 99 of the state's 100 counties. Mecklenburg County, the state's most populous urban county, initiated a fully capitated managed care program in 1996, and by 2002 became the last of the 100 counties to start an ACCESS program. Initially, providers were paid a \$3 per member per month (pmpm) case management fee for the first 250 patients and \$2.50 pmpm for each member thereafter; however that rate has declined over the years and now stands at \$1 pmpm. Services are and have always been paid on a fee for service (FFS) basis in the ACCESS program.

The goals of Carolina ACCESS were to simultaneously enhance access to care and control costs by eliminating duplication of services and preventing unnecessary emergency room utilization. The need to reduce costs became more pressing through the 1990s because of a tightening state budget. Opportunities to achieve cost savings within the ACCESS program without specific management programs were limited by the willingness of individual providers to restrain costs. Cost reductions were further limited after the enactment of the 1997 Balanced Budget Act (BBA), which mandated coverage for emergency room services provided if a "prudent layperson" would have believed an emergency existed.²

To cope with the increasing state budget pressures and to expand on what were viewed as promising early results with ACCESS, the State created and implemented a more aggressive program of community based care management in 1998. That enhanced program is now referred to as Community Care of North Carolina (CCNC), but is often called Access II and III.

Certain Medicaid recipients, including families receiving cash assistance under the Temporary Aid to Needy Families (TANF) program, children, and people with disabilities who are not also receiving Medicare, are generally required to enroll in a managed care system. The recipient's enrollment into one of the Medicaid managed care programs is more a function of their choice of PCP than a conscious choice between managed care models. That is, Medicaid beneficiaries are assigned to the program (ACCESS or CCNC) in which their Primary Care Providers (PCP) participates. Pregnant women, dual eligibles (individuals covered by both Medicaid and Medicare), and foster children are enrolled in managed care on a voluntary basis. The medically

² The Balanced Budget Act (BBA) of 1997 changed the Medicaid statute, requiring states to reimburse all emergency room visits when a "prudent layperson" would have a reasonable belief that an emergency condition existed. This made it more difficult for the state Medicaid agency or primary care providers to control inappropriate use of the emergency room, which had been an area of significant cost savings for Carolina ACCESS in previous years.

needy, institutionalized individuals, and undocumented immigrants³ are excluded from participation in Medicaid managed care programs.

In counties where CCNC operates, PCPs are invited to participate in the program if they agree to fulfill certain responsibilities. Participating PCPs are expected to participate in network activities, follow recommended clinical practice guidelines to assess patients and develop treatment plans, help educate patients about how to manage their own care and use appropriate medical equipment, provide clinical information for management systems, provide 24/7 coverage under program rules and carry minimum liability insurance. Providers who are unwilling to participate in these program rules are enrolled as ACCESS providers. Primary care providers enrolled in Community Care of North Carolina receive an enhanced case management fee (\$2.50 per member per month versus \$1.00 per member per month for ACCESS providers); which provides an additional financial incentive to participate in CCNC. The networks that form the core of the local effort also receive a \$2.50 per member per month (pmpm) enhanced care management fee that must be used to hire local case managers, or otherwise pay for the resources necessary to manage enrollees. The goal of the program and the purpose of the enhanced case management fees are to develop local disease management and care coordination in a way that reduces Medicaid expenditures by encouraging efficient and appropriate utilization of health care.

At a minimum, the CCNC networks include local PCPs, a local hospital, the Department of Social Services (DSS), and the health department. These participants are formally linked through a 501(c)(3) non-profit corporation agreement, which receives the case management fees and coordinates services. Each network is responsible for population health management which involves identifying individuals with certain high-cost or complex health conditions in need of case management, assisting PCPs with disease management education, helping patients coordinate care, and collecting and reporting program and patient data back to DMA. Each network elects a physician to serve as their Medical Director. The local Medical Directors participate in the statewide Clinical Directors Board, which is responsible for steering the disease management and case management initiatives of the statewide Community Care of North Carolina program.

The Clinical Directors Work Group identifies projects to implement in the CCNC networks and establishes the processes and strategies to accomplish program goals. Some initiatives, such as diabetes and asthma care management, are implemented statewide, while others are tested or operate in individual programs and later may be implemented more widely. Asthma and diabetes were chosen as two of the early statewide disease management initiatives because the projects met guidelines established by the Clinical Directors⁴. Guidelines for disease management are selected in consultation with experts in the field, and are based upon existing evidence-based models of care management specific to the disease. The process of disease

³ Undocumented immigrants are generally ineligible to receive Medicaid, with the very limited exception of coverage for emergency medical conditions.

⁴ A minimum number of Medicaid enrollees were identified as having either diabetes or asthma, and clinical practice guidelines had already been developed (externally) for management of both diseases. Additionally, treatment outcomes and processes were easy to measure and evidence existed of the benefit of such programs in terms of health improvement. Finally, it was generally accepted that physicians would support disease management of these diseases and would accept that improvements could be made in their clinical practice.

management involves continuous coordination between PCPs and the CCNC network care coordinators. The Clinical Directors Group also establishes measures to assess the initiatives' impact on quality and health outcomes.

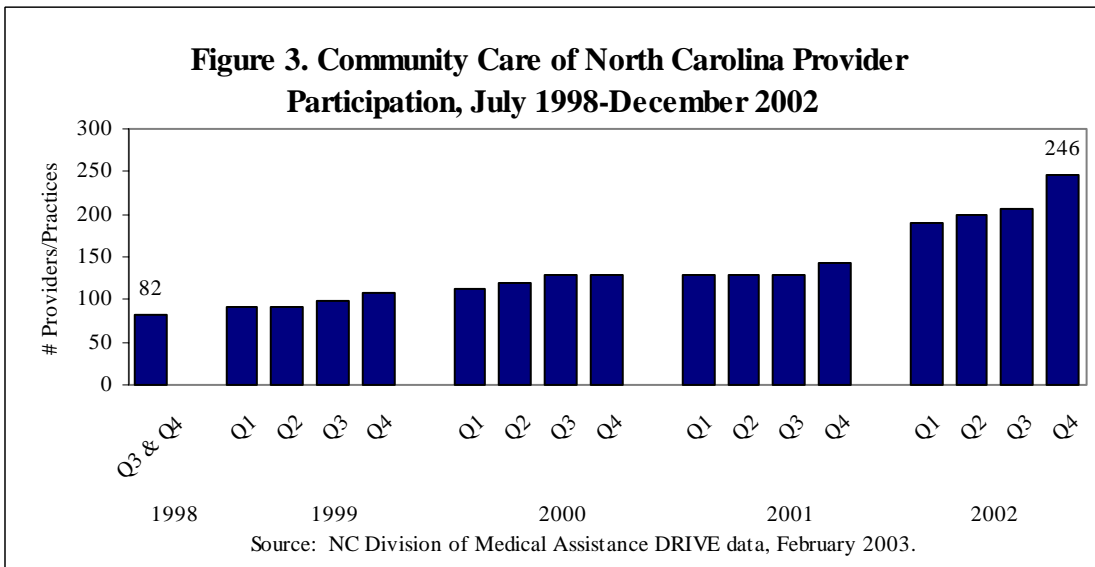
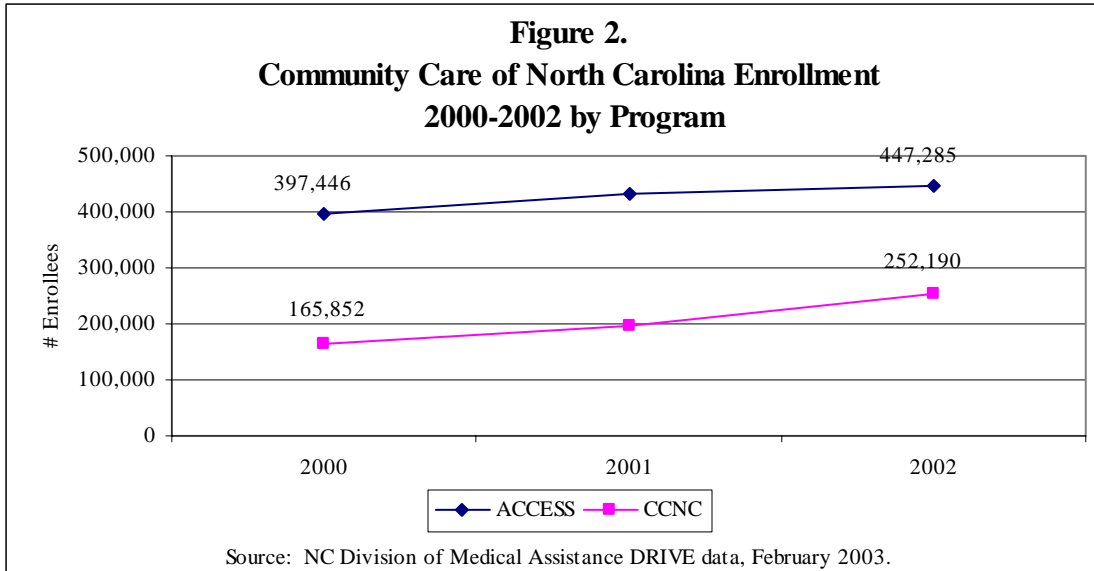
Although Community Care of North Carolina currently includes a number of disease and case management initiatives, this report focuses only on the diabetes and asthma initiatives. Other initiatives are either too new or too localized to make meaningful observations about their impact on costs and utilization. These initiatives should be evaluated in the future, pending the availability of data for such analysis. A more thorough explanation of North Carolina's Medicaid managed care program, including a discussion of other disease management initiatives, is provided in 'Innovative Primary Care Case Management Programs Operating in Rural Communities: Case Studies of Three States'⁵.

Community Care of North Carolina Program Growth

Initially, DMA issued a request for proposals (RFP) to identify counties interested in developing local networks to serve their Medicaid populations. In order to target providers who already had a strong commitment to the Medicaid population and to being part of the safety net, the state limited participation in the program to communities where local physician groups managed at least 2,000 Medicaid patients. The state also permitted rural provider practices to pool their recipient lists to achieve the 2,000 minimum. Of the fourteen submissions, nine projects were selected to test the enhanced PCCM model. Six of the original projects were individual "Access II" networks within individual counties, one was a network of pediatric providers across 32 counties, and two were "Access III" networks. The differences between Access II and III networks was that all or virtually all of the primary care Medicaid providers in the county agreed to participate in the local networks in Access III communities; only a portion of all primary care providers agreed to participate in Access II counties.

Since 1998, the program has gradually expanded to include additional counties in the original access networks and to develop new networks in other counties. At the end of the study period, (through December 2002) there were twelve CCNC projects operating in the state (Figure 1). Those twelve networks incorporated some 246 providers/practices that were responsible for 252,190 Medicaid beneficiaries at the end of December 2002. Figures 2 and 3 illustrate that both program enrollment and provider participation over the three years were gradual and reflect the state's planned program expansion efforts. In fact, the concerted effort to expand CCNC led to enrollment growth in CCNC which exceeded the growth in ACCESS during the study period. From January 2000 through December 2002, CCNC enrollment grew by 52.1% while the ACCESS program only grew 12.5%.

⁵ http://www.shepscenter.unc.edu/research_programs/rural_program/wp76.pdf



Evaluating Disease Management Programs

Making assessments of the effectiveness of Medicaid disease management programs can be complicated depending on the questions to be answered. Because of the newness of these programs, analyses of performance have been limited, and the assessments that have been conducted have not been subject to peer review. Understanding the effects of a primary care case management and disease management initiative in an operating environment such as a statewide Medicaid program is not a simple task. When a program is piloted and later implemented more widely, there is little opportunity to identify clear starting and ending points to isolate specific program effects. Practitioners are treating patients on a continuous basis and a patient may switch between Medicaid managed care programs while under care for the same episode of disease, or even lose Medicaid coverage entirely. Likewise, the implementation of a program such as the CCNC entails training managers and orienting practitioners, which can only be accomplished incrementally.

Several recent *AcademyHealth* reports that track the implementation and effects of primary care and disease management systems identify key methodological issues involved in the evaluation of Medicaid disease management programs⁶. To begin, it is essential to understand the nuances of the population enrolled in the disease management initiative. If the program design permits self-selection of patients or their providers into the disease management program, there could be systematic differences between the populations that limit the ability to compare the two groups with regard to costs or health outcomes. According to Thomas Wilson, “the key is ensuring that the factors other than the intervention that could potentially influence the outcome are the same...if equivalence is achieved the calculation compares what happened to the disease management population’s health and health care resource use compared to what was expected to happen in the same population in the absence of disease management.” (Wilson, 2003) Differences between the disease-managed and non-managed groups such as age, gender, or health status have the potential to affect comparisons of costs or outcomes between participants and nonparticipants. These confounding factors can be adjusted for in the analysis, or one could stratify the population based on these characteristics. Further, if disease management was rolled out over time with voluntary provider participation, as it was in North Carolina, the practice style of early-adopting providers could differ in important ways from those who came late to the game, in which case the best solution is to incorporate a longitudinal aspect to the analysis that shows changes in the groups pre- and post-intervention.

It is also important that evaluation methodologies are developed with respect to medical inflation, benefit design and the introduction of new therapies. These confounding factors can yield changes in costs, utilization, or outcomes and must be controlled for in the analysis. Again, the essential question is “What would have happened to the disease management population’s health and health care resource use had they not received the intervention?” (Wilson, 2003).

The frequency with which individuals shift on and off Medicaid can also create difficulties for evaluators in that a baseline is hard to establish with a shifting population. “Medicaid case mix changes as enrollees cycle on and off the program. Spending levels in any given year may be more reflective of which patients are enrolled in the program during the time than of the care management of the disease management initiative” (Wheatley, 2002). Further, interruptions in care can limit the effectiveness of a disease management initiative, and researchers must decide whether to limit the study population to individuals who are enrolled without a break during the focus time period. Depending on the scale of the intervention, such restrictions can vastly reduce sample size and jeopardize the significance of the findings.

It is also important to carefully consider the time frame of the evaluation. It is widely accepted that disease management programs do not produce immediate improvements in costs and utilization; in fact, better adherence to drug therapies, which lead to long-term decreases in utilization, can actually lead to short-term increases in costs. Studies should be designed to accommodate this pattern, particularly when establishing a baseline for comparison. “If the

⁶ *AcademyHealth* serves as the national program office for State Coverage Initiatives (SCI), a national initiative of The Robert Wood Johnson Foundation that works with states to plan, execute, and maintain health insurance expansions, as well as to improve the availability and affordability of health care coverage. The *AcademyHealth/SCI* website (<http://www.statecoverage.net/>) includes links to several of the reports discussed in this section.

baseline is calculated based on first-year spending averages, the savings reported in the following years may be inflated” (Wheatley, 2001). This problem also suggests consideration of restrictions on the sample population to include only individuals with continuous enrollment.

Finally, the research design must carefully select the measurements on which performance comparisons will be made. The primary foci of Medicaid disease management program evaluations are costs and quality, and there are a variety of indicators which can be used to assess both. A wide range of quality indicators may be used depending on the components of the initiative, including process measures such as the number of health education sessions, essential (disease-specific) screenings, and providers adopting clinical practice guidelines. Additionally, quality can be evaluated using outcome measures that include improved clinical indicators (e.g. weight, HbA1c levels) or decreased utilization of inpatient services. With regard to assessment of costs, the analysis can be framed in terms of overall cost savings (per member per month costs), component cost-savings (reductions in costs associated with hospital admissions, days, or ER visits), or return on investment (which takes into consideration both cost savings and program costs). The decision of which measure(s) to include is important for demonstrating the successes and shortcomings of a state’s initiative and each measure is requires different considerations of the methodological issues previously discussed.

Findings from Disease Management Programs

Because Medicaid disease management is such a new concept and proper assessment of performance cannot be made immediately, the literature on these programs is limited, at best. The most commonly cited study of the effectiveness of Medicaid disease management, published in the September 2000 issue of *Inquiry*, showed that the Virginia Health Outcomes Partnership’s asthma management program succeeded in reducing ED utilization by 18 to 41% (depending on the initiative in which the physician participated) over the course of a year for disease management participants (Rossiter, 2002). Additionally, the study projected cost savings of \$3 to \$4 for every \$1 of program costs. Other assessments in states have shown decreased health services utilization among diabetics (Lob, 2000) and asthmatics (Jowers, 2000) enrolled in Medicaid disease management programs in California and Pennsylvania. However, these studies show that favorable changes in utilization and cost savings are not consistently observed for all categories of care, such as emergency room use and pharmaceutical use; further the improvements are shown to vary by stratification of patients and providers.

Technical papers and reports have also been produced by state Medicaid agencies, state auditing agencies, and nongovernmental organizations under contract with Medicaid. These evaluations show mixed results of program performance and are difficult to draw conclusions from because of the various methodologies used. Nonetheless, some of this “gray literature” suggests promising results with regard to performance assessments. An assessment of North Carolina’s diabetes project showed improvement in quality indicators of Medicaid disease management participants (McArdle, 2002). In Florida, reports from the Legislature’s Office of Program Policy Analysis and Government Accountability (OPPAGA) have been strongly critical of the disease management program as a whole, frequently pointing out that it has yet to determine whether it achieved its targeted cost savings goals (OPPAGA, 2001). An unpublished study by researchers at Gerogetown University and Florida State University showed that the disease

management initiatives was associated with both lower program costs and slightly lower utilization of inpatient, outpatient and pharmaceutical benefits; however, their results were inconsistent for the various diseases covered (Parker, 2001). In sum, the few evaluations of Medicaid disease management initiatives have shown mixed results, but do suggest potential for both cost savings and outcome improvements among enrollees.

However, a considerable literature exists describing the commercial insurance market and the private sector's extensive experience with disease management. There are comprehensive reviews of the performance of disease management programs—especially for asthma and diabetes, published in the peer-reviewed literature (Gillespie, JL 2002) and a comprehensive review and annotated bibliography issued by the National Pharmaceutical Council, Inc. based on the same work (Gillespie JL 2002). These reviews provide some supporting evidence of the positive impacts of disease management programs but the standards for comparison of the results and the quality of the studies varied widely. The best summary assessment of the state of the art in disease management show promise for improving quality of care and reducing costs, but definitive studies, outside the Medicaid context, have not been completed. There is strong evidence in support of the use of team care and coordinated services in the treatment of chronic disease, especially diabetes and to a lesser extent, asthma (Stanton 2001 and Stafford 2003).

METHODOLOGY

The Sheps Center compared the costs and utilization of Medicaid recipients diagnosed with asthma or diabetes who were enrolled in ACCESS and CCNC. This comparison of monthly costs and yearly utilization between ACCESS and CCNC was conducted using Medicaid claims and enrollment data furnished by the Division of Medical Assistance. DMA identified all Medicaid beneficiaries that met the criteria for asthma or diabetes between January 1, 2000 and December 31, 2001 using definitions DMA developed that are described in Appendix 1. They then furnished to the Sheps Center all Medicaid enrollment and claims data for those beneficiaries for the time period January 1, 2000 through December 31, 2002. The enrollment data contained demographic data as well as information about the type of Medicaid program the beneficiary was enrolled in for each month of the three-year period. The claims data contained every claim paid for each beneficiary during the time period and included information on the date and type of service, as well as the cost of the service. Data for all beneficiaries were included in the analysis. There were no exclusions made on the basis of disability (eligibility category) or age.⁷

⁷ Although children under 3 years old are typically not diagnosed with asthma, our analysis included these children because data constraints prevented an accurate process of excluding children under 3 years old. That is, eliminating children under age 3 who met one of the criteria would exclude 3,101 kids; however, these 3,101 kids accounted for 1,588 ER visits for asthma after turning 3. Without access to all of the National Drug Codes (NDC) and service codes used by the state to identify persons eligible for CCNC disease management services, it is not possible to appropriately separate the children who should be excluded from the analysis. Therefore, all children were retained in the analysis. Additionally, persons with disabilities were included in the analysis.

The analysis looked at asthma and diabetes claims separately. Claims were included in each disease specific analysis beginning the month after the enrollee met the criteria for inclusion in the disease initiative. An enrollee meeting the criteria for both asthma and diabetes was included in both analyses. Only 3.75 percent of the total person-months of covered care were for individuals with both diagnoses. Person-months are used to assess the overlap because an individual may have diabetes or asthma for part or their covered care and both for another part. The costs for individuals with both diagnoses were not separately calculated in the analysis, because of the small numbers. For each claim, an enrollee was assigned to ACCESS or CCNC based on their enrollment status for the month that the service was rendered. If an enrollee was not participating in the Medicaid program for any given month, claims for that month were not included in the analysis. Inpatient claims were assigned to ACCESS or CCNC based on program affiliation on the day of discharge. Age of enrollee for each claim was computed based on the enrollee's age on the first day of the month that the service was received.

Because beneficiaries' program affiliation fluctuated, the number of enrollees varied from month to month. The number of enrollees included as of July of each year is defined in Figures 4 and 5. A more detailed description of the enrolled populations for diabetes and asthma is contained in Appendices 2 and 3.

Although, optimally, the analysis of utilization and program costs would be limited to individuals who were continuously enrolled over the three year time period; our analysis showed that the sample size of individuals with diabetes or asthma was too small to allow a meaningful analyses (Figure 6). For example, there were only 32 people who were diagnosed with diabetes, and only 2 people diagnosed with asthma at the beginning of the study period (January, 2000), and who were continuously enrolled in CCNC for the full three years.

Figure 4. Medicaid Program Enrollment, 2000-2002, Individuals Meeting Asthma Criteria

Year	ACCESS	CCNC
2000	4,159	1,530
2001	9,920	4,561
2002	12,237	6,270

Source: NC Division of Medical Assistance, July 2003.

Figure 5. Medicaid Program Enrollment, 2000-2002, Individuals Meeting Diabetes Criteria

Year	ACCESS	CCNC
2000	10,717	1,824
2001	14,169	2,480
2002	15,051	3,156

Source: NC Division of Medical Assistance, July 2003.

Figure 6. Number of Medicaid Enrollees Diagnosed with Either Diabetes or Asthma as of January 2000 Who Were Continuously Enrolled for Three Years (Jan 2000-Dec 2002)

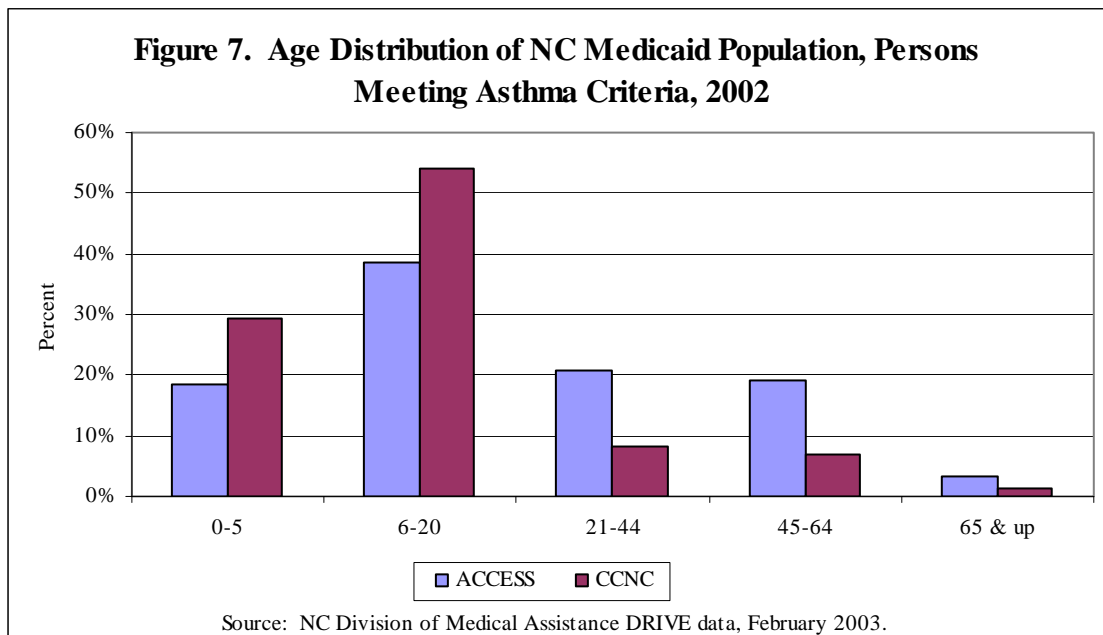
	ACCESS	CCNC
Asthma	8	2
Diabetes	214	32

Source: NC Division of Medical Assistance, July 2003.

FINDINGS - ASTHMA

Age Distribution

Figure 7 shows the age structure of the Medicaid program for persons meeting the asthma disease criteria for inclusion in the program. Across all three years of data analyzed for asthmatics, CCNC had a younger enrolled population than ACCESS, which is not unexpected given the concerted effort to enroll pediatric Medicaid providers in the CCNC networks (Appendix 2). Eighty-three percent of the CCNC enrollees are under 21 years of age, compared to only 56.8% of the ACCESS enrollees. Because of the significant differences in the age distribution between ACCESS and CCNC, it was necessary to adjust the cost data to reflect the differences in age distribution across the two programs.

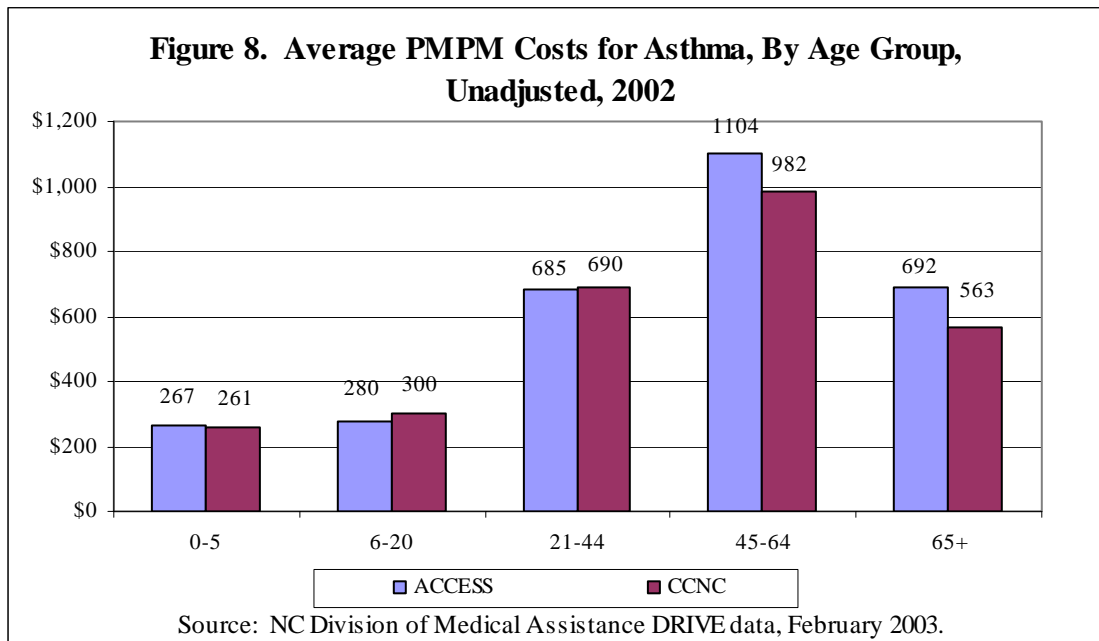


Costs per Enrollee

In order to compare costs across type of enrollees and for specific disease categories, we use the “per member, per month” costs estimates (pmpm). The average pmpm costs for people with asthma in ACCESS in 2002 was \$534 compared to \$378 for CCNC. These estimates include all of the Medicaid costs, including the physician case management fee and the additional CCNC network fee. However, this 29% savings is likely to be an overestimation of the cost savings associated with CCNC because ACCESS has a disproportionate number of older Medicaid enrollees cared for in the program. These older patients generally consume more health care resources than children and young adults. Figure 8 depicts the pmpm costs for the ACCESS and CCNC patients by age group and illustrates that the average cost of care for patients with asthma who are over age 20 is substantially higher than the average cost for the 0-20 population cohort.

To appropriately estimate differential costs between the CCNC and ACCESS Programs, the data were adjusted to reflect the age-cohort differences in savings. In 2002, the cost savings for CCNC were concentrated primarily among individuals 45+ years old, with some small savings in

the 0-5 year old group. Expenditures for care in CCNC were 2.2%, 11.1% and 18.6% less among CCNC enrollees in the 0-5, 45-64, and 65+ age groups, respectively. CCNC care was slightly more expensive than ACCESS for both the 6-20 year old (7.1% greater) and 21-44 year old (.7% greater) cohorts; these two more costly groups comprised 62.3% of the enrolled populations of CCNC in 2002.



Age adjustment of the cost projection statistically corrects for the disproportionate number of young individuals in CCNC, who are less costly to treat and for whom CCNC seems to have less ability to affect cost savings. To age adjust, the CCNC age group specific pmpm costs are applied to the ACCESS age distribution. This approach provides a better approximation of the total costs for the program, if the CCNC population more closely resembled that of the ACCESS population. Figure 9 summarizes the results of the age adjustment process and estimates the pmpm overall costs for the CCNC program if the patient population matched that of the ACCESS patients in 2002.⁸

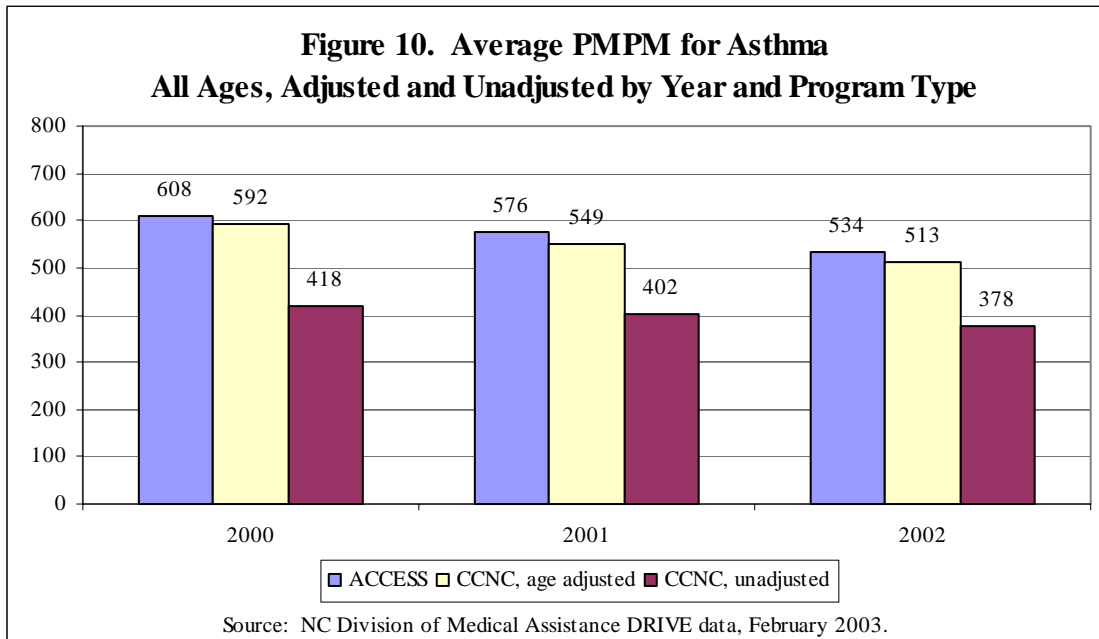
Taking the age adjusted cost estimates, a smaller difference in pmpm costs is observed between the ACCESS and CCNC than in the raw estimates (Figure 10). The age adjusted pmpm cost differential in 2002 decreased to \$21, or a 3.9% savings, versus the unadjusted estimate of \$156, a 29% savings pmpm. Assuming a constant population for all 12 months of 2002, the estimated annual cost savings for CCNC is \$1,580,040.

Figure 9. Age-Adjusted Costs, Asthma Patients, 2002

Age Cohort	CCNC pmpm	ACCESS age distribution (%)	Age-weighted Cost
0-5	\$261	18.4	\$48.02
6-20	\$300	38.4	\$115.20
21-44	\$690	20.7	\$142.83
45-64	\$982	19.2	\$188.54
65 +	\$563	3.3	\$18.58
Total PMPM, Age Adjusted			\$513.17

⁸ Age adjustment calculations for 2000 and 2001 are included in Appendices 4 and 5.

Figure 10 displays the average pmpm costs for ACCESS and CCNC (adjusted and unadjusted) for 2000-2002. A similar pattern is evident in these years. Figure 11 summarizes the estimated monthly and annual cost savings for all three years.



The per member per month savings attributable to the CCNC for asthma patients increased after the first year of the program. In 2000, the resulting difference in pmpm costs between programs after age adjustment is \$16 or 2.6% savings across 1,530 CCNC enrollees. This cost savings totals \$24,480 per month and \$293,760 per year. In 2001, the age adjusted pmpm cost difference between ACCESS and CCNC increased to \$27 or 4.7%; with 4,561 CCNC enrollees; the total monthly cost savings equals \$123,147 or \$1,477,764 per year. That savings rate dropped back to \$21 pmpm in 2002 but the higher number of enrollees yielded a higher total program savings.

Figure 11. Age Adjusted Cost Savings Projections, Asthma

	Age Adjusted pmpm Savings	# CCNC Beneficiaries	Monthly Savings	Annual Savings
2000	\$16	1,530	\$24,480	\$293,760
2001	\$27	4,561	\$123,147	\$1,477,764
2002	\$21	6,270	\$131,670	\$1,580,040
Total				\$3,351,564.00

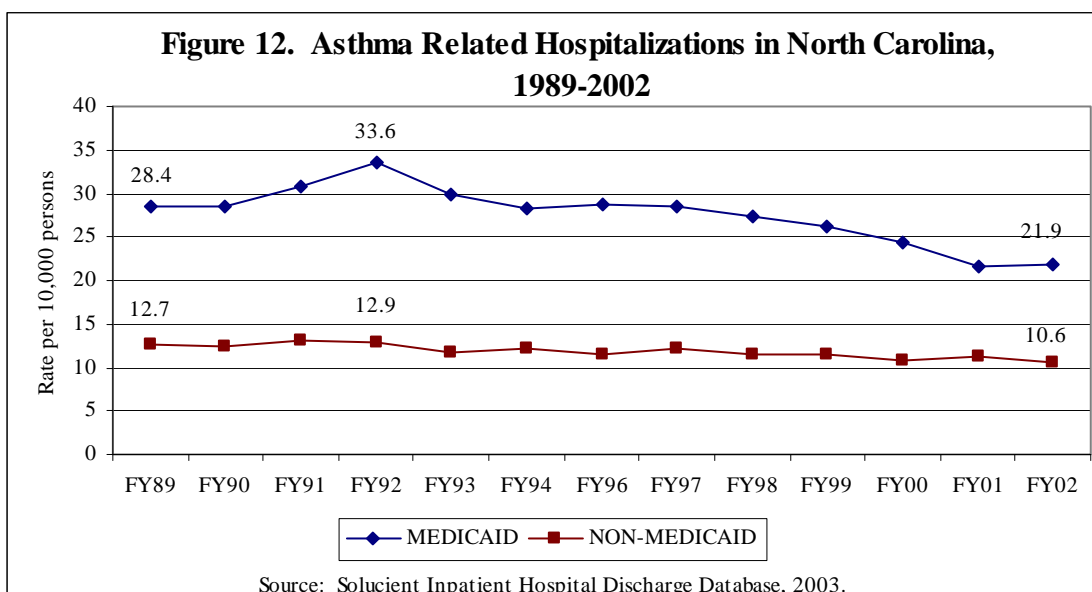
*Note: Annual savings estimations are likely to be overstated because they were calculated assuming beneficiaries remain in CCNC for entire 12 months of year, which is not typical or likely.

Utilization

Per patient costs reflect the intensity of care as well as the input costs of personnel and resources but are not the only way to measure the benefits of a disease management program. The goal of the CCNC program is to better coordinate care to allow disease and its consequences to be

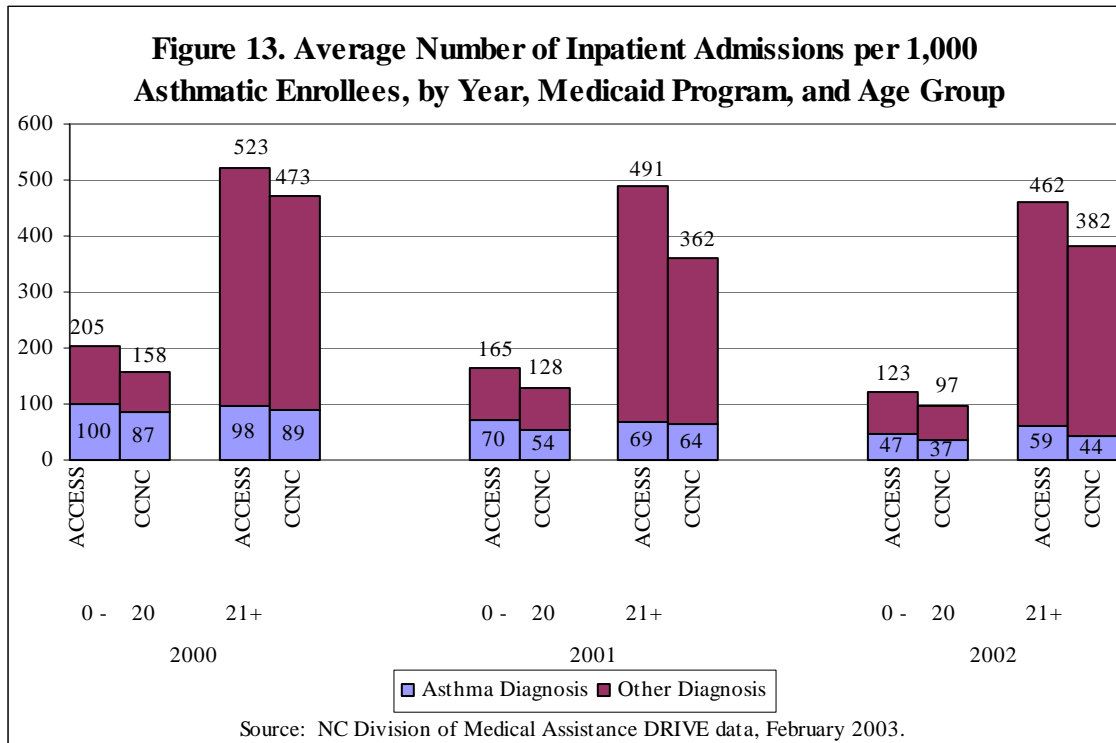
prevented or its effects diminished. The outcomes of these efforts are also reflected in the utilization of services among patients and for the overall enrolled population.

One key indicator of use which also has high costs is hospitalization. As Figure 12 demonstrates, Medicaid asthma-related hospitalizations on a per-enrollee basis have historically been higher than in the non-Medicaid population. In fact, in all years except 2001, the rate among Medicaid is at least twice that in the non-Medicaid population. However, the graph also demonstrates improvements in hospitalization rates among the Medicaid population: after peaking in 1992 the rate steadily declined until 2001 (by which time it had decreased 37% from 1992) and then increased slightly again in 2002. In contrast, the rate of asthma related hospitalizations among the non-Medicaid population remained relatively constant throughout the entire period. During the three year study period (FY 00-02), the hospitalization rates decreased by 10.2 % for all Medicaid patients, but only 2.8% in the non-Medicaid population. This is an important context for appreciating the changes in utilization in the CCNC population presented throughout the following section.



The ACCESS and CCNC programs both recognized the need to reduce the overall need for hospitalization. Admission rates for enrollees were tracked for the three year period under study and the Figure 13 illustrates that the average number of inpatient admissions per 1,000 Medicaid enrollees with asthma has consistently been lower in the CCNC program than in the ACCESS program. In 2000, there were 23% fewer hospital admissions per 1,000 CCNC enrollees under the age of 21 than there were for ACCESS enrollees. This relationship stayed relatively constant over the years (with 21% fewer inpatient admissions in CCNC than in ACCESS in 2002). The differential in hospital admissions between CCNC and ACCESS enrollees age 21 or older grew over the three year time period, from 10% fewer admissions in the CCNC program (2000) to 17% (2002). Differences in the rate of asthma-specific inpatient hospitalizations grew over the three years for both age groupings. For example, for children (0-20), CCNC enrollees experienced 13% fewer asthma-related hospitalizations in 2000 than those enrollees in ACCESS, and the differential grew to 21% in 2002. Older CCNC enrollees (21 or older) experienced 9%

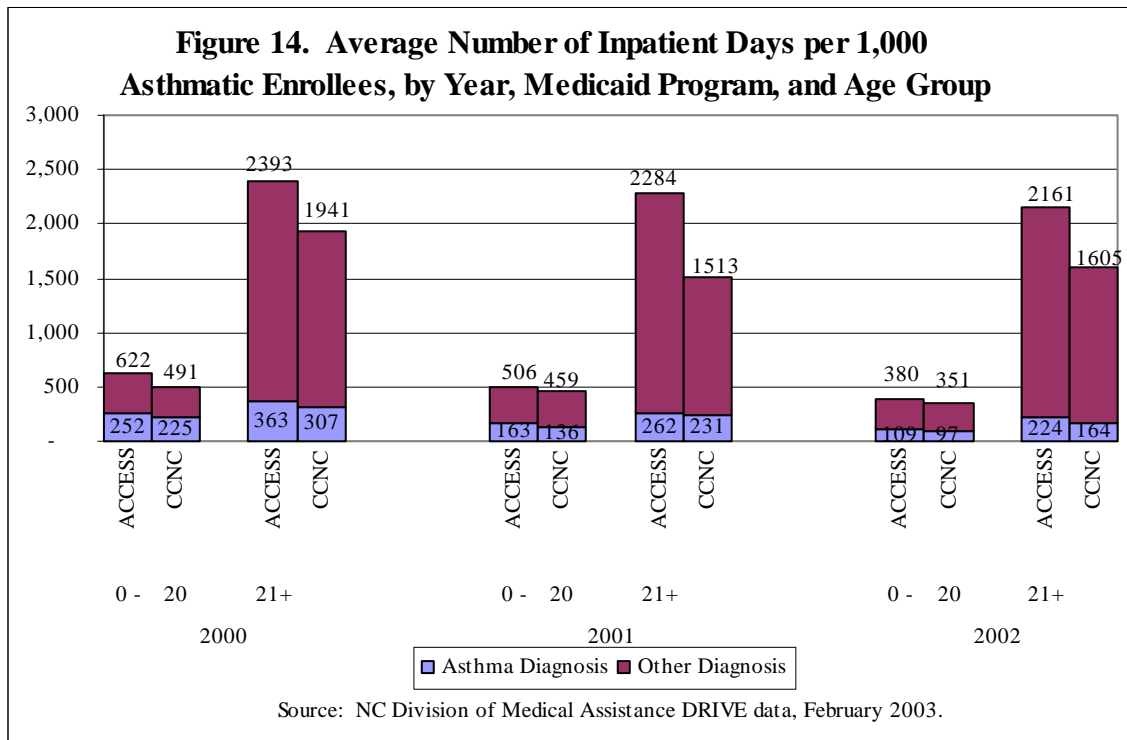
fewer hospitalizations in 2000, but 25% fewer in 2002. This suggests that the CCNC program may be having a greater effect on reducing inpatient hospitalizations than the ACCESS program; particularly for asthma-related admissions.



Hospitalization trends over the three year period are also illustrative. The rate of inpatient hospitalizations per 1,000 enrollees has declined for both enrollees in ACCESS and CCNC. The greatest reductions observed are in asthma-related hospitalizations in the CCNC program: over the three year period asthma-related hospitalizations per 1,000 enrollees decreased 57.5% and 50.6% among CCNC enrollees ages 0-21 and 21+, respectively, as compared with 53% and 39.8% declines among ACCESS enrollees of the respective age cohorts. Except for the rate of decline for overall hospitalizations for children, the rate of decline has been greater in the CCNC program than in the Access program.

A closely related measure of utilization is the intensity of the hospitalizations that do occur, commonly measured as inpatient days, or days spent in the hospital per 1,000 enrollees. These rates are described in Figure 14. Again, the average number of inpatient days per 1,000 asthmatic enrollees has consistently been lower in the CCNC program than the Access program. In 2000, there were 21% fewer inpatient days for all types of hospital admissions per 1,000 CCNC asthmatics under the age of 21 than there were for ACCESS enrollees. However, by 2002 the difference had narrowed, with only 8% fewer inpatient days per 1,000 asthmatics under the age of 21. The rate of decline over the three years was greater for enrollees in the 0-20 cohort in the ACCESS program than in CCNC; however. In 2000, there were 19% fewer days per 1,000 enrollees in the CCNC program than in ACCESS. This grew to a 26% differential by 2002. Differences in the days per 1,000 for asthma-specific inpatient hospitalizations followed a slightly different pattern. The difference did not change for children (11% fewer days in the

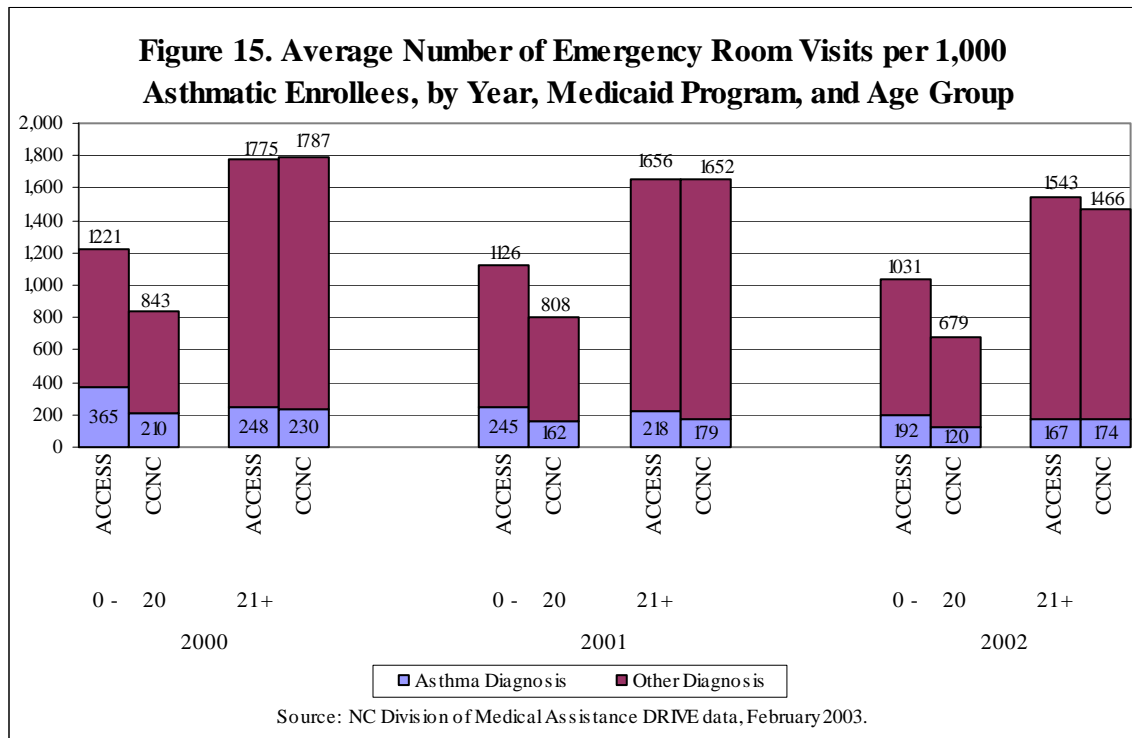
CCNC program than ACCESS in both 2000 and 2002); but grew for the adult population (15% fewer days in 2000 compared to 27% in 2002).



Overall, the days per 1,000 declined by 28% for people with asthma enrolled in the ACCESS program, and 30% for the CCNC program. Again, the greatest improvements over the three year period were observed in the 0-20 year old cohort; however, CCNC improvements lagged behind those observed in ACCESS. Inpatient days per 1,000 enrollees ages 0-20 in ACCESS declined by 38.9% while days per 1,000 in CCNC decreased by 28.5%. Among the population 21+ years old, CCNC did perform better: between 2000 and 2002 inpatient days per 1,000 enrollees in CCNC were reduced by 17.3% while the decline for ACCESS was only 9.7%. The trends for asthma-related inpatient days are similar to those observed in admissions: overall, asthma-related admissions per 1,000 declined by 48% in ACCESS and 54% in CCNC over the three year period. The rate of decline in asthma-related hospitalizations per 1,000 was identical among ACCESS and CCNC enrollees for the 0-20 group; however, asthma-related hospitalizations decreased by 46.6% for CCNC enrollees over the age of 21 as compared with 38.3% in the ACCESS population.

The use of the emergency room showed a slightly different pattern. The use of the ER has been consistently lower among CCNC children than ACCESS children, but not significantly different among adults. For example, CCNC children had 31% fewer ER visits for any reason in 2000, and 34% fewer ER visits in 2002 than did ACCESS children. CCNC children had 42.5% fewer ER visits for asthma related diagnoses in 2000 than did ACCESS children, although this difference had narrowed a bit by 2002 (37.5%). For adults, the picture was less clear. In fact, CCNC adults had slightly higher use of the ER room (1%) than did ACCESS adults (2000). By

2002, CCNC adults were 5% less likely to use the ER for overall visits than adults enrolled in ACCESS, but were 4% more likely to use the ER for an asthma episode.



Overall, the use of the ER declined most substantially for asthma-related conditions in both the CCNC and ACCESS program, and the decline was slightly greater among ACCESS enrollees than among CCNC. This suggests that factors other than disease and case management may be leading to the decreased use the emergency room among Medicaid recipients.

Another measure of utilization that reflects changes in need and/or the effects of preventive services is the use of prescription drugs. Prescription drugs can be both part of the interventions that prevent disease and reduces its effects. Higher costs for prescription drugs may reflect appropriate long-term and unmeasurable cost-saving if subsequent episodes of illness are prevented. At the same time, there are opportunities to use pharmacotherapy in ways that reduce overall use of drugs by substituting single agents for multiple therapies or for practitioners and programs to make the most appropriate and effective use of drugs, sometimes substituting equally effective lower-cost (usually generic) drugs.

Reflecting the overall trend in pharmaceutical use, the number of prescriptions per enrollee with a diagnosis of asthma has decreased over time for both program types with a slightly greater proportional decrease for the CCNC enrollees. Among CCNC enrollees, there was a 26% decrease in the number of prescriptions per child and a 10% decrease for adults between 2000-2002. In the ACCESS program, there was a 23% decrease in the number of prescriptions per child and a 7% decrease for adults.

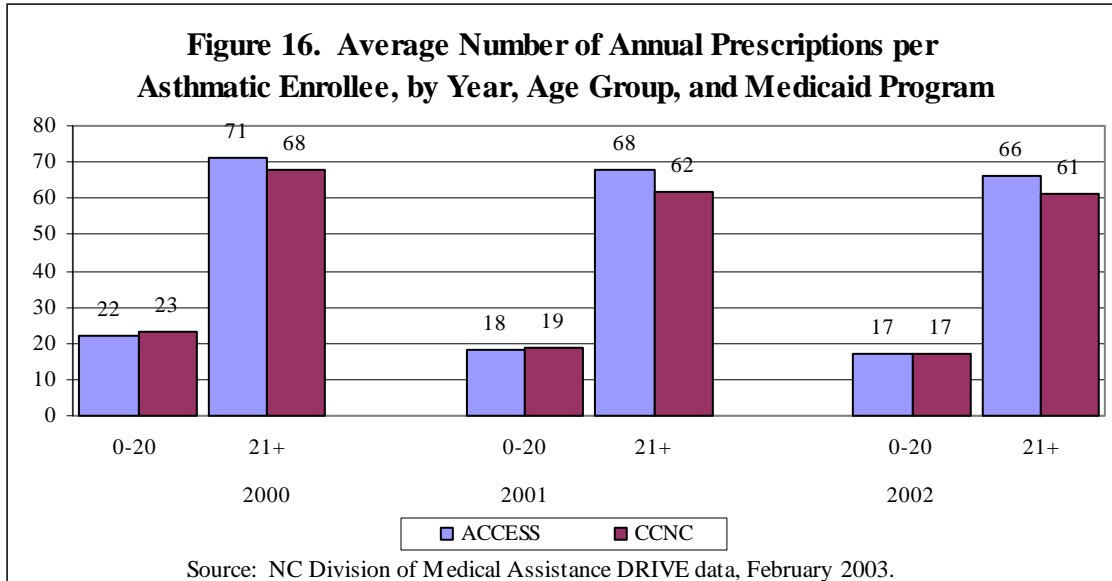
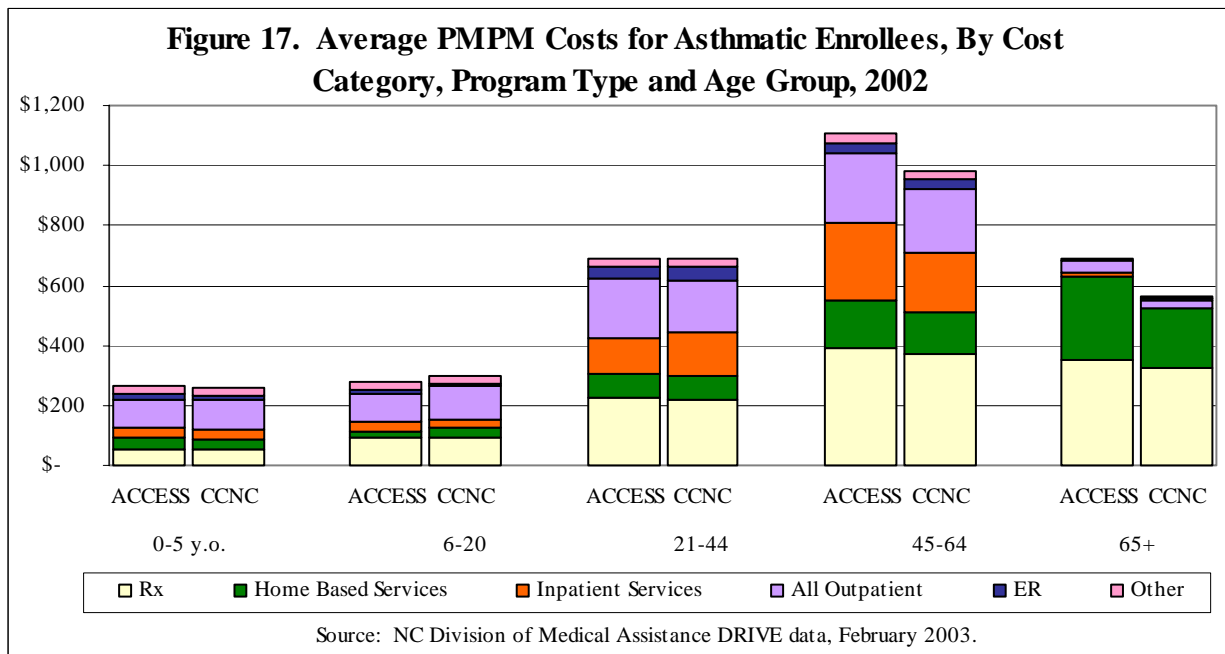


Figure 17 illustrates the relative components of costs for asthma patients by age groups across the type programs. The chart illustrates how comparable the overall cost structures are when viewed as a whole. The age grouping illustrate how the CCNC program generates substantial pmpm cost savings for older patients compared to younger patients with the largest contributor to the difference coming from inpatient services in the 45-64 year age groups and from emergency room costs in the over 65 group. For the oldest age group, Medicare is the primary payer of hospital, physician, home health and other outpatient charges (although Medicaid is the sole payer for outpatient prescription drugs).



Geographic Variations in Costs for Asthma Care

Examining counties with at least 1,000 enrollees, we found large variations in per member per month costs. Statewide, the average per member per month costs for children under the age of 21 varied from a low of \$152.79 pmpm in Wilson County to a high of \$402.80 pmpm in Buncombe County (Appendix 6). Variations in pmpm costs across counties do not reflect differences in charges as Medicaid generally pays a uniform rate for the same services statewide.

As previously discussed, the CCNC was rolled out incrementally, starting with a limited number of counties in 1999. Additional counties and regions joined CCNC later. The costs per member per month for each county presumably reflect many factors, including the length of time in the program, provider practice patterns, and characteristics of the enrolled populations. We examined the data to determine whether changes in enrollment could account for the differences in pmpm costs (for example, counties with more experience treating asthma might have better health outcomes and consequently lower costs). While enrollment generally grew over time, its growth was not consistently correlated with a reduction in costs.

In Beaufort County (Figure 18), both enrollment and costs showed consistent increases. In Wayne, Pitt, and Buncombe Counties (Figures 19-21), enrollment increased but costs declined. In Robeson County (Figure 22), costs remained stable while enrollment increased. These mixed patterns made it difficult to determine if length of time on the program or increased enrollment could explain cost reductions or increases. The varying patterns of change at the local level suggest multiple competing reasons why a county would have the patterns it did.

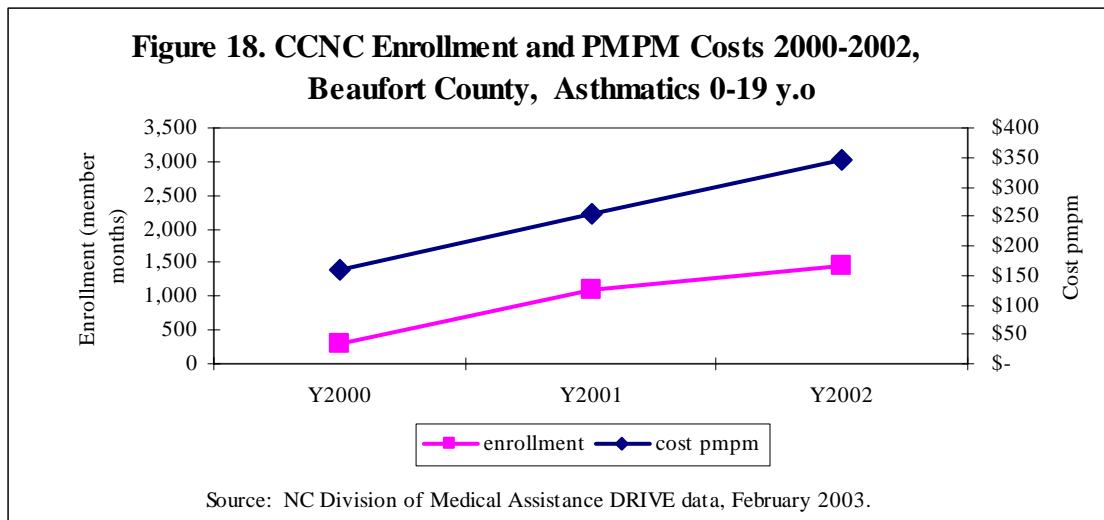
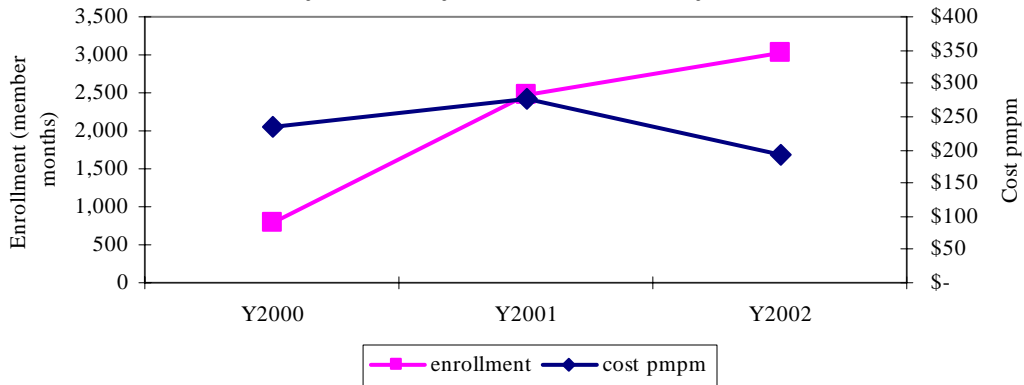
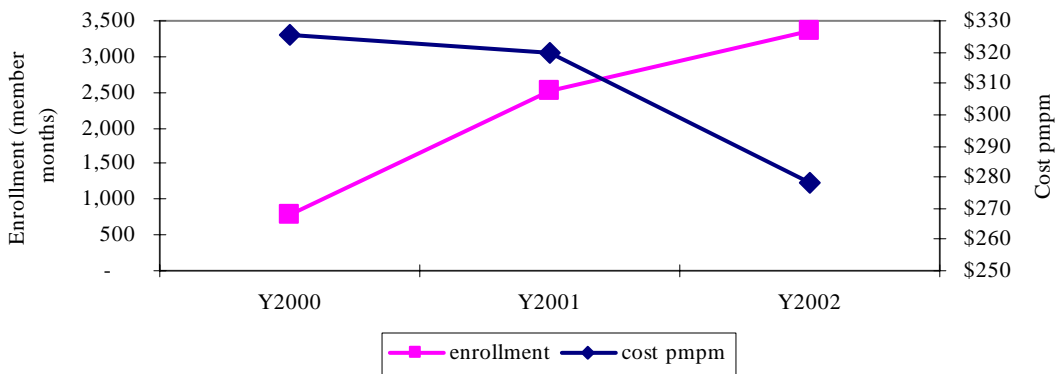


Figure 19. CCNC Enrollment and PMPM Costs 2000-2002, Wayne County, Asthmatics 0-19 y.o



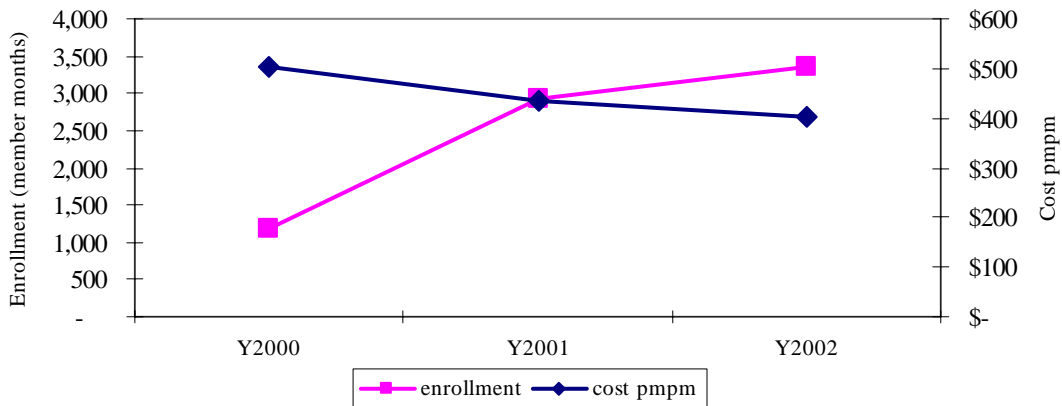
Source: NC Division of Medical Assistance DRIVE data, February 2003.

Figure 20. CCNC Enrollment and PMPM Costs 2000-2002, Pitt County, Asthmatics 0-19 y.o

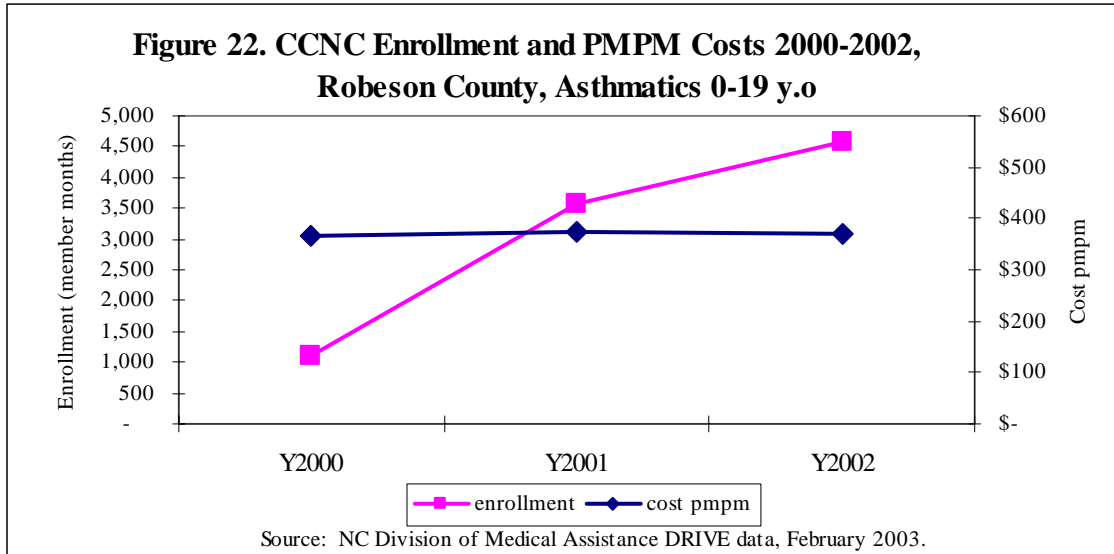


Source: NC Division of Medical Assistance DRIVE data, February 2003.

Figure 21. CCNC Enrollment and PMPM Costs 2000-2002, Buncombe County, Asthmatics 0-19 y.o



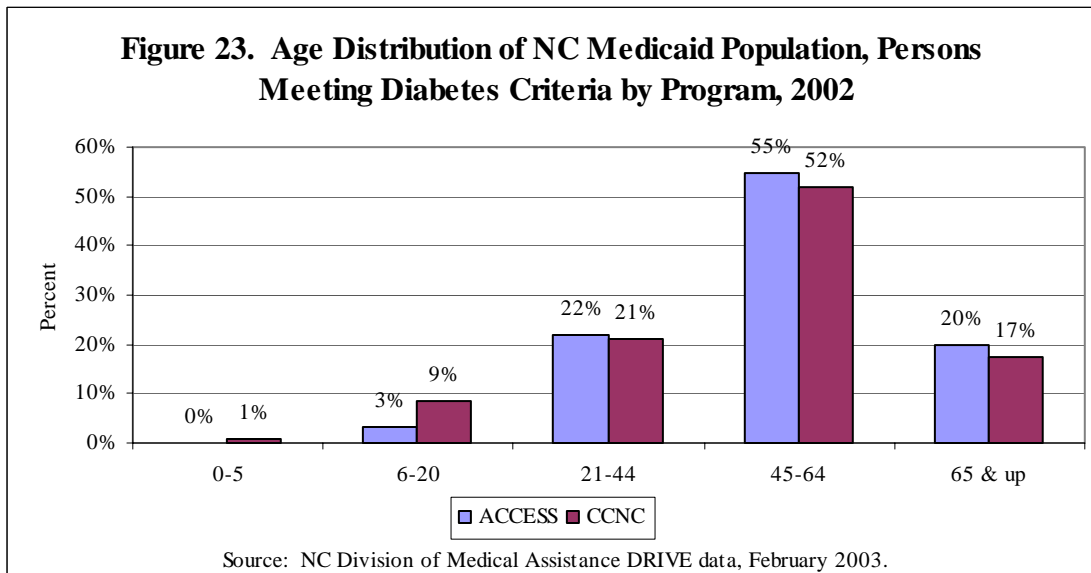
Source: NC Division of Medical Assistance DRIVE data, February 2003.



FINDINGS – DIABETES

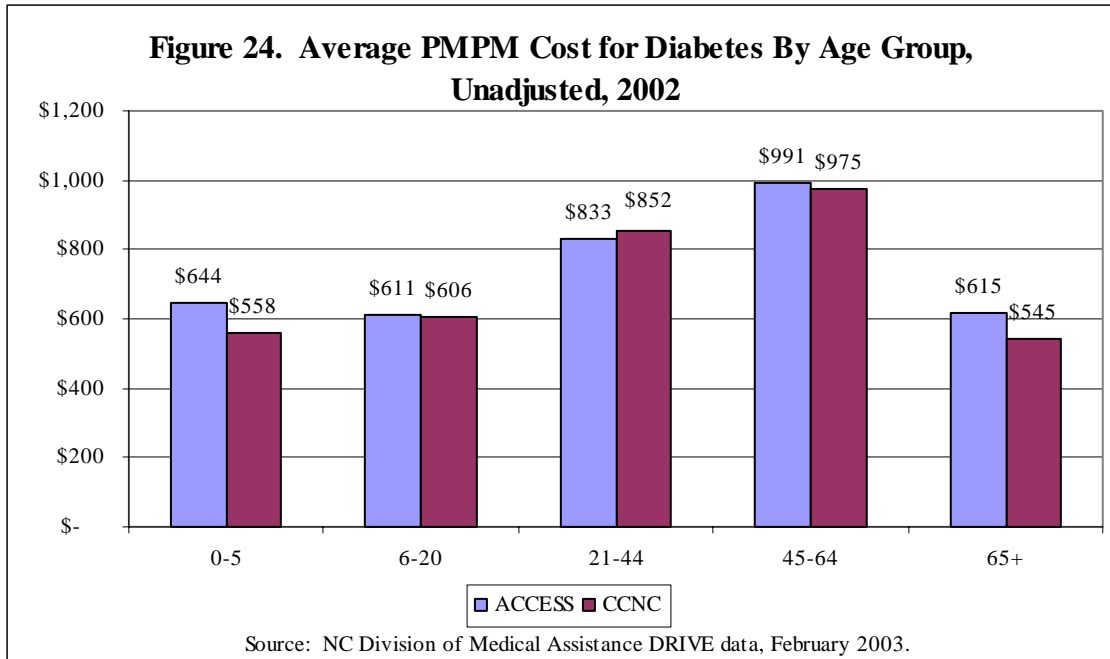
Age Distribution

Figure 23 shows the age distribution of persons meeting the diabetes criteria in the Medicaid programs. Given the nature of the disease, it is not surprising that this is an older population than the asthma cohort. There are relatively few children, with the largest proportion of the population between the ages of 45 and 64 years. The second observation is that there is not much difference in the age distribution between those who were treated in the CCNC programs, compared to those who remained in the ACCESS programs. Consequently, we did not need to age adjust the results of the analysis, as was necessary for the asthma evaluation.



Costs Per Enrollee

Figure 24 compares the average per member per month costs during 2002 for patients in ACCESS compared to patients in CCNC. The largest differences are in the under age 6 population and the 65 and older population (which collectively accounted for between 16% and 18% of the diabetic population enrolled in CCNC). In the most numerous age category, age 45-64, CCNC demonstrated modest savings of \$16 per person, or 1.6% savings over the cost of the ACCESS program. However, in the second largest age category, 21-44 year olds, the pmpm cost was \$19 higher for CCNC, for a 2.3% greater cost than the ACCESS program.

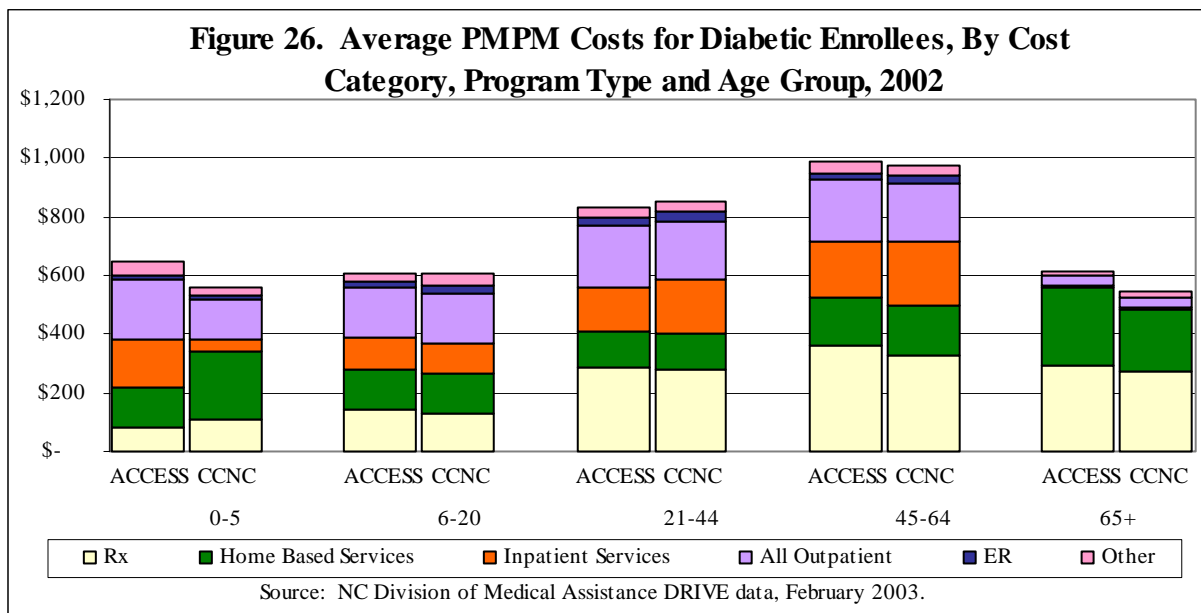


With all age cohorts combined, the average pmpm cost was \$880 for ACCESS patients and \$859 for CCNC patients in 2002, for a difference of \$21 pmpm. Based on this difference the overall savings for CCNC is estimated to be \$306,432 on an annual basis, or \$2,083,824 over the three years (Figure 25).

	Number People CCNC	ACCESS pmpm	CCNC pmpm	Cost Savings pmpm in CCNC	Total Savings CCNC
2000	1,824	\$809	\$795	\$14	\$306,432
2001	2,480	\$889	\$856	\$33	\$982,080
2002	3,156	\$880	\$859	\$21	\$795,312
Total 2000-2002					\$2,083,824

Figure 26 compares the average costs for the ACCESS and CCNC diabetic populations in 2002 by age group. As expected the cost of care increases with age. For the oldest age group, Medicare is the primary payer of hospital, physician, home health and other outpatient charges

(although Medicaid is the sole payer for outpatient prescription drugs). Consequently the Medicaid payments are lower. For each of the age groups, the largest single cost component is prescription drugs, and this also grows by age group. The second largest category of expense is outpatient services, which includes doctor visits and clinic care. The proportion of the costs that are attributed to inpatient care increases with each successive age group.



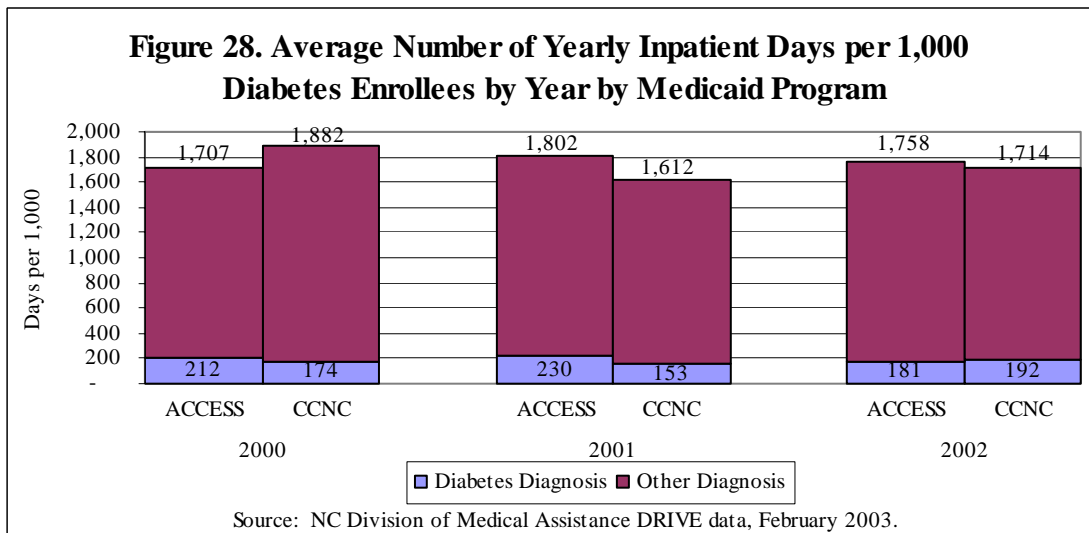
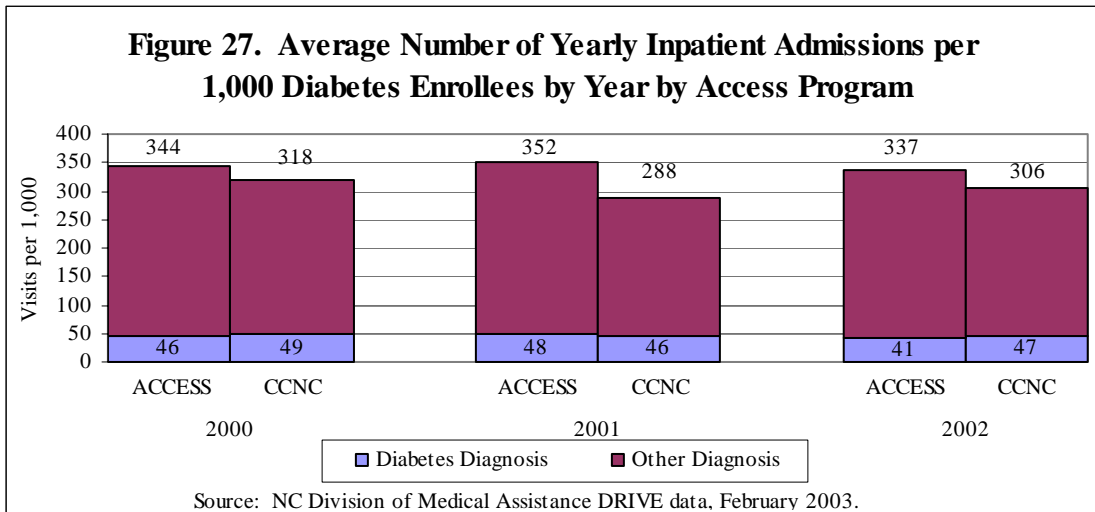
Utilization

Figure 27 shows the admission rate per 1,000 diabetics during the three-year study period. Diabetics are admitted to the hospital frequently, at nearly three times the rate of a general population. When all admissions for diabetics are counted regardless of the discharge diagnosis, the rate for ACCESS ranged from 337 to 352 days, while the rate for CCNC ranged from 288 to 318 days. In all three years, the rate of hospitalization was lower in CCNC, which is one of the goals of the disease management approach. In 2002, the hospitalization rate for CCNC was 306 admissions per 1000 persons, 9% lower than the corresponding rate for the ACCESS enrollees.

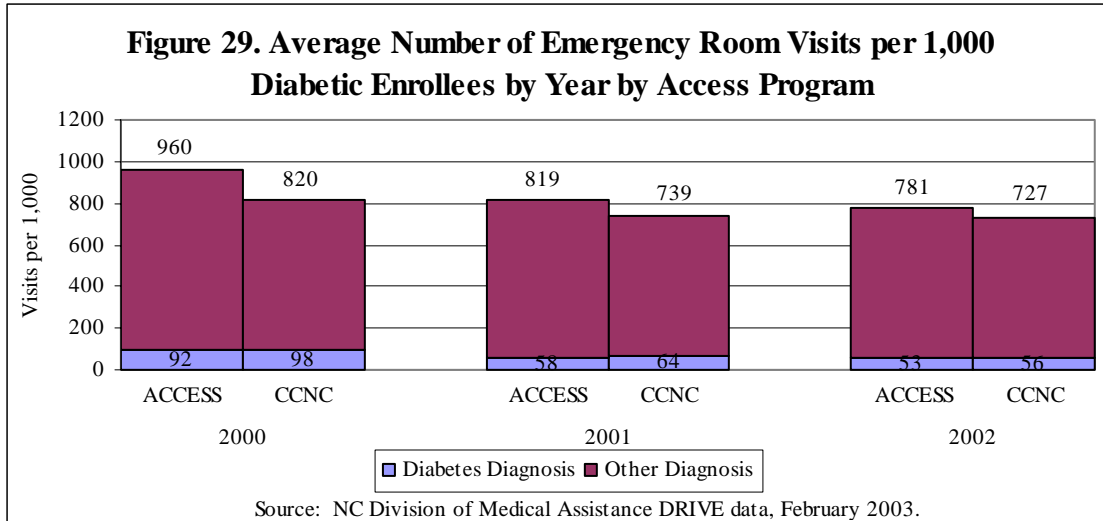
While the hospitalization rate for the diabetic population is high, diabetes is the primary discharge diagnosis in a relatively small proportion of the hospitalizations: 12-16% of the cases. This is most likely a reflection of a significant number of co-morbid conditions among these patients.

As expected from the high admission rate, the diabetic population also exhibits a high rate of inpatient days per 1000 population. (Figure 28). When counting inpatient days for all diagnoses, the ACCESS rate ranged from 1,707 to 1,758 days per 1,000 persons over the three-year time period. The corresponding rates for the CCNC population ranged from 1,882 days per 1,000 in 2000 to 1,714 in 2002. Although CCNC days were higher in 2000, by 2002, days had been reduced below the rate for ACCESS. However, diabetes-related inpatient days showed an opposite trend over the three year period. When only the primary discharge diagnosis of diabetes is considered, the day rates for CCNC actually increased from 174 to 192 days per 1,000

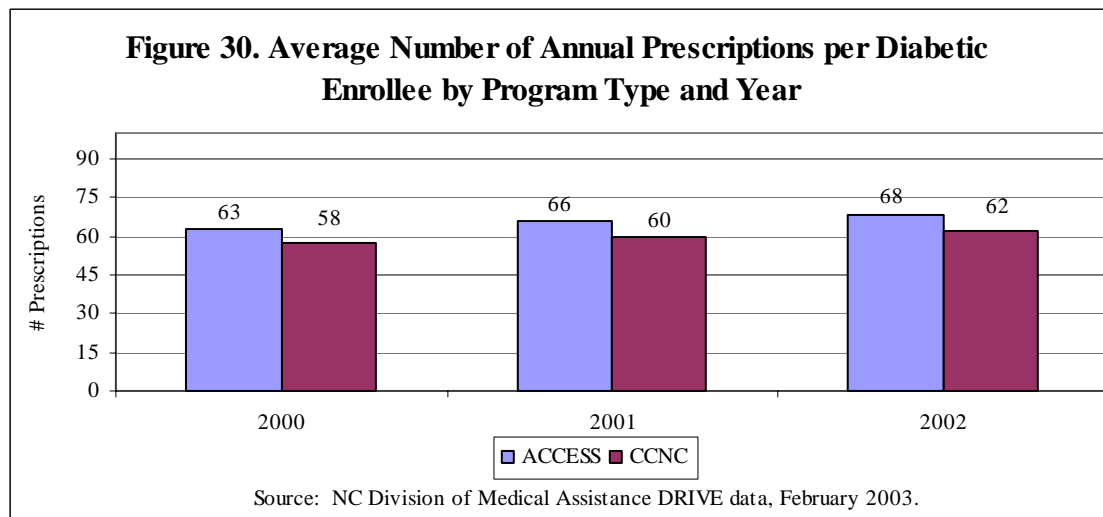
between 2000 and 2002, while the rate declined from 212 to 181 days per 1,000 in the ACCESS population. Even more unusual is that the diabetes-related hospitalizations per 1,000 had actually decreased substantially in 2001 among CCNC enrollees, but increased in 2002.



The diabetic population uses the emergency room with high frequency. Figure 29 shows the ER visit rate per 1,000 population for the three year study period, comparing ACCESS with CCNC. While the rates are high, there is evidence of some decline over the three years. When the use of the ER by this population is measured for all diagnoses, the rates were 960 visits per 1,000 persons for ACCESS and 820 visits for CCNC in 2000. Two years later they have declined to 781 visits for ACCESS compared to 727 for CCNC, or a 19% decline for ACCESS and 11% decline among CCNC enrollees. The rates are significantly lower when just examining ER visits for the diagnoses of diabetes. The rates have almost half in 2002 what they were in 2000. The fact that so few ER visits for this population have a primary diagnosis of diabetes continues to show that this population has co-morbidities that may be exacerbated by diabetes.



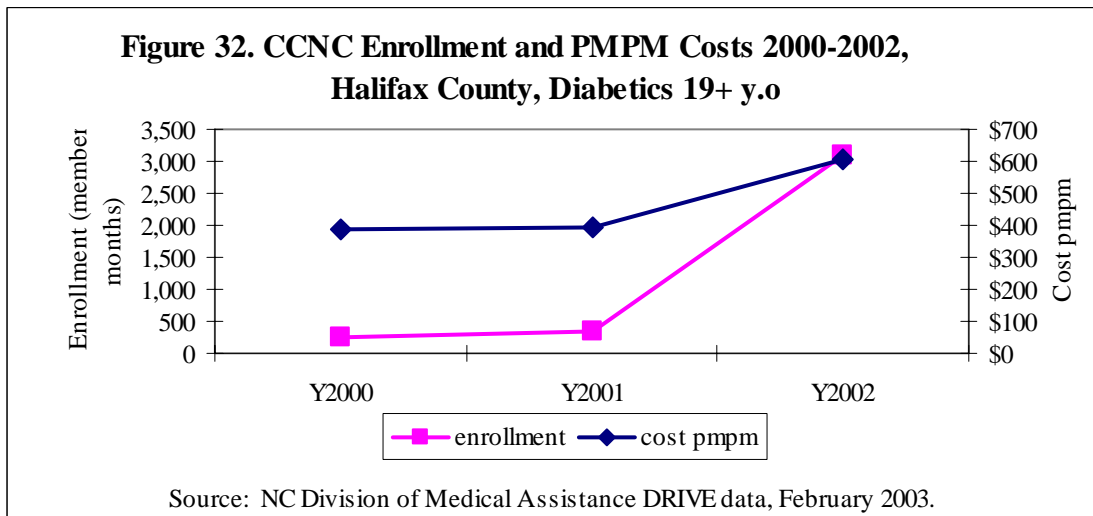
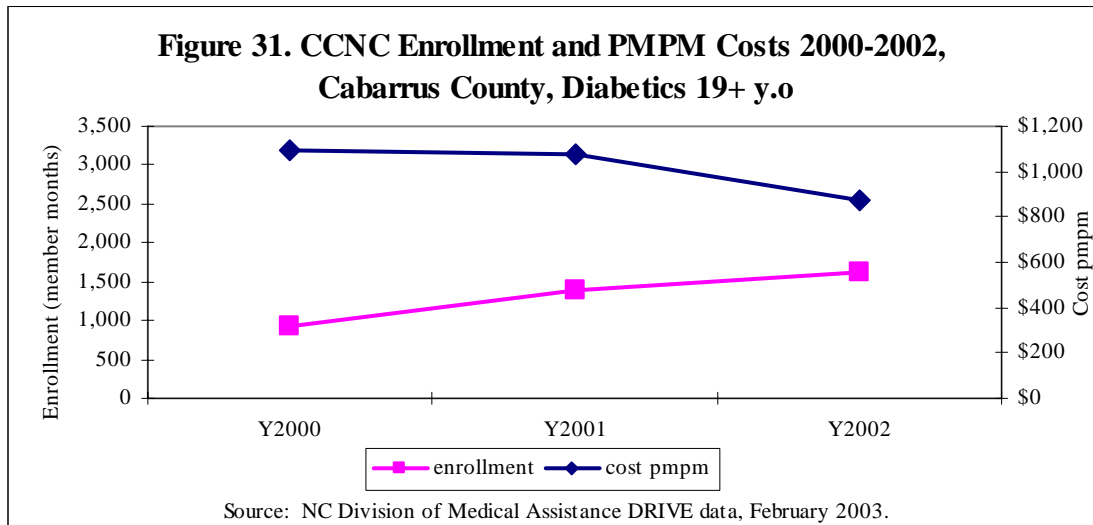
The prescription use of the diabetic population over the three-year study period is shown in Figure 30. The average number of prescriptions per year is very high, though these rates do not necessarily represent individual drugs. Each refill is counted as a separate drug, such that if a patient renews a prescription each month during the year, it is counted as 12 drugs. The rate of prescription drugs has increased over the three years for both ACCESS and CCNC, though in each year the rate is lower for CCNC. In 2002 the rate for CCNC is 62 per person for CCNC which is 8.8% fewer than the rate for enrollees in the ACCESS program.



Geographic Variations in Costs for Diabetes Care

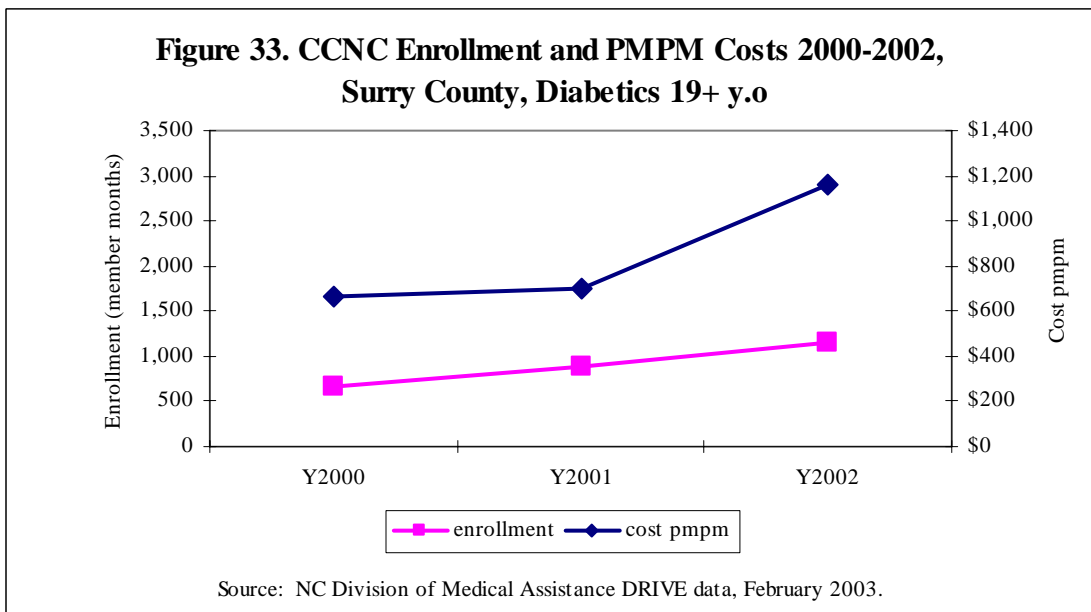
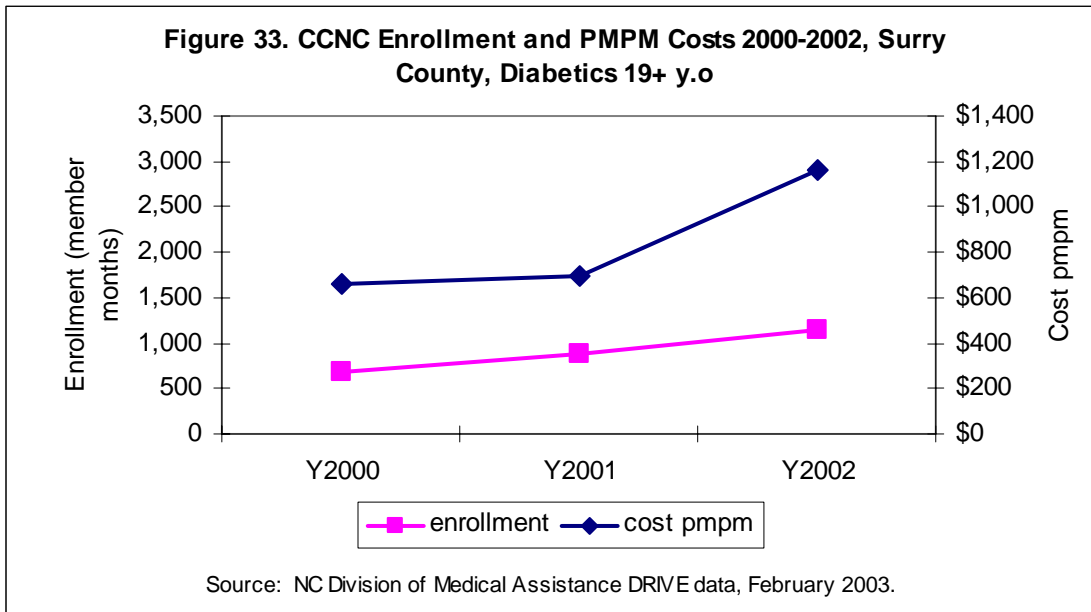
As with asthmatics, overall pmpm costs varied considerably across network locations for diabetics. Again, the analysis was limited only to include counties with at least 1,000 enrollees to reduce bias from low county enrollment. The average pmpm costs for diabetics over the age of 19 varied from a low of \$609 pmpm in Halifax County, to a high of \$1,160 in Surry County in 2002 (Appendix 7). During the study period only three counties, the ER by this population is measured for all diagnoses, the rates were 960 visits per 1,000 persons for ACCESS and 820

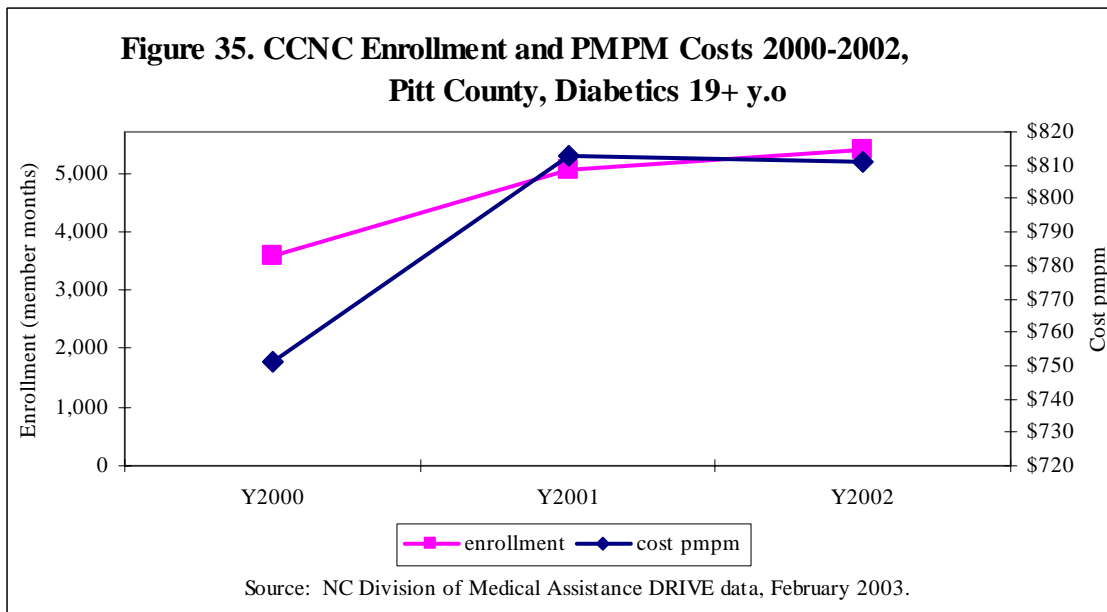
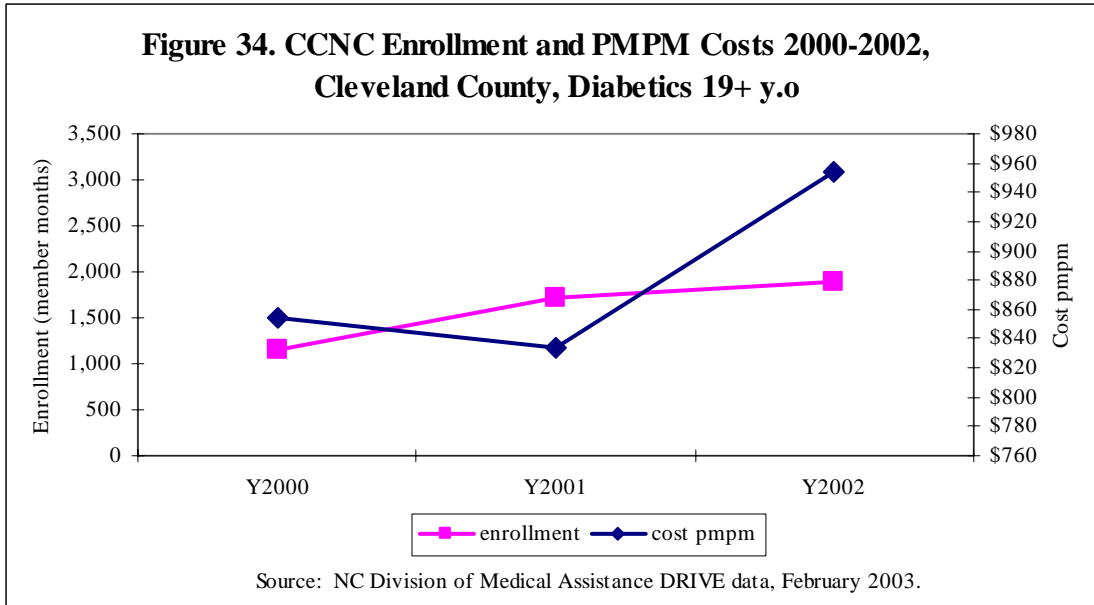
visits for CCNC in 2000. Two years later they have declined to 781 visits for ACCESS compared to 727 for CCNC, or a 19% decline for ACCESS and 11% decline among CCNC enrollees. The rates are significantly lower when just examining ER visits for the diagnoses of diabetes. The rates have almost half in 2002 what they were in 2000. The fact that so few ER visits for this population have a primary diagnosis of diabetes implies that this population has co-morbidities that may be exacerbated by diabetes.



Buncombe, Cabarrus (Figure 31) and Forsyth, experienced overall declines in pmpm costs. In both Cabarrus and Buncombe Counties, the decrease over the three-year period was 20%; however it is worth noting that these are both counties with historically high costs relative to the rest of the state. In all other counties, costs increased over the three year period, ranging from 8% in Pitt County to 75% in Surry County (Figure 33). The steepest increases were observed in Halifax (Figure 32) and Surry (Figure 33) Counties, where sizeable increases in the enrolled population occurred over the three year period. Also, despite the increase noted in pmpm costs, Halifax County had the lowest pmpm costs during the entire study period. Other counties, such as Cleveland (Figure 34) and Gaston Counties showed instability in pmpm costs over the three

year period, while a few such as Edgecombe and Pitt Counties (Figure 35) seemed to be reaching a stable point in pmpm costs.





LIMITATIONS

This report has stressed the importance of adjusting for differences in the populations enrolled in ACCESS versus CCNC. Differences in age, gender or health status could further confound the analyses in this report beyond the adjustments we made. There was a significant variation in the age of the Medicaid recipients with asthma who were enrolled in the two programs; a higher percentage of children with asthma were enrolled in the CCNC program than in the ACCESS program. The cost and utilization analyses were stratified by age to adjust for this difference. There was less age variation among the program enrollees with diabetes so a similar stratification

was not needed. While we made every attempt to adjust for known differences among the enrollees in both programs; there are other differences that could affect the analyses that we were unable to address. Potentially, there could be differences in the underlying acuity of the enrollees in the two programs that could confound the program results. We were unable to adjust for differences in the initial health condition of the patient populations.

Additionally, were we unable to strictly limit our analyses to those recipients who had been diagnosed with diabetes or asthma as of the beginning of the study period and who stayed in the CCNC program for the full three years. Because so many Medicaid enrollees cycle in and out of the program, the number of people who had been identified as having one of the target conditions and who were continuously enrolled over the three year study period was too small to analyze. The interruptions in eligibility can limit the effectiveness of the disease management initiative, so that the full benefit of the program would not be accurately reflected in program utilization or costs. Further, the program mix, use of services and costs can change as Medicaid enrollees cycle on and off the program. While there is no reason to suspect that the people enrolled in the CCNC program are more or less likely to cycle through the program than those in ACCESS, this could confound the analyses.

The analyses were also limited in that we only analyzed three years of data. Disease management programs generally do not produce immediate results and it may take several years to see a real improvement in health status with the related reduction in health care costs. CCNC has only been operational since 1998; thus, the savings attributable to the CCNC program may actually under report potential savings and changes in health status as the program matures.

Conversely, the initial program savings may be difficult to realize in other locations across the state. The cost savings identified in this analysis may be driven by the differences among the providers who have chosen to participate in CCNC thus far. “Early adopters” are more likely to be supportive and engaged in the disease and case management program. It is unclear if the CCNC can achieve the same cost savings and changes in utilization in communities where provider practice style varies substantially from the early adopters. For this reason, it is important to reassess the effectiveness of the program as it is expanded statewide.

CONCLUSIONS/DISCUSSION

This analysis shows that during the 2000-2002 time period, the CCNC program helped reduce overall health care expenditures for individuals with asthma and diabetes. The savings appear to be greater for the treatment of individuals diagnosed with asthma than among those with diabetes. After adjusting for the different age distribution between ACCESS and the CCNC program, we project that North Carolina may have saved approximately \$3.3 million in the three year time period for people with asthma over what the state would have spent if these individuals were enrolled in Carolina ACCESS. The projected cost savings for diabetes care for the three year period totals approximately \$2.1 million.

Much of the projected savings for people with asthma is due to a reduction in hospital use among CCNC enrollees. Although the number of inpatient admissions, length of stay, and emergency room admissions declined in both the ACCESS and CCNC groups, the decline was generally greater in the CCNC program. The average number of yearly inpatient admissions per 1,000 asthmatic enrollees declined by 38% in the CCNC program between 2000 and 2002, compared to a drop of 30% in the Access program; average days per 1,000 declined by 30% in CCNC, compared to 28% in Access; and ER admissions declined by 22% in CCNC compared to 21% in ACCESS. In North Carolina, hospital admissions declined during the period 1989 through 2002 for both the Medicaid and non-Medicaid populations. Our findings suggest that CCNC may have affected further reductions in a declining trend of hospital inpatient admissions, and it suggests that the CCNC does a better job helping individuals with chronic illness manage their health care problems.

The state also appears to have achieved savings in the CCNC program for people with diabetes; although the savings were not as large. Between 2000-2002, the state saved approximately \$2.1 million in the CCNC program for people with diabetes compared to what they would have spent if the people were enrolled in ACCESS. While there were fewer hospitalizations in CCNC than in ACCESS, the average number of inpatient admissions per 1,000 Medicaid enrollees with diabetes did not change significantly over the three year study period. As noted previously in this report, people with diabetes are more likely to have co-morbidities, making it more difficult to manage their care.

Although the savings have been relatively modest to date, there are several factors that suggest that state may be able to achieve additional cost savings as the program is rolled out across the state. First, the state may be able to achieve greater cost savings as it enrolls an older population. The CCNC program appears to have had more impact at reducing costs among older population groups than it did among younger populations. As noted previously, CCNC enrolled a higher proportion of young people than did the ACCESS program. As CCNC is expanded across the state, it will begin enrolling a greater proportion of adults into the program. If the state achieves the same cost savings as the program is expanded as it did in the initial networks; then the state is likely to see greater cost savings as more adults are enrolled in the program. We anticipate that the state could have saved an additional \$5.9 million in 2002 had all the ACCESS enrollees been enrolled in CCNC, and if the state achieves the same level of savings (Figure 36) among the different age cohorts as the program is expanded statewide. Again, this projection depends on the assumption that there are not significant differences between the providers and beneficiaries that have participated in CCNC from those who have not.

The greatest potential for future cost savings lies in reducing practice variations among network sites toward the patterns of the more effective practices. As noted throughout the report, there are significant variations in the pmpm costs of treating people with asthma or diabetes among the different CCNC networks. (Appendices 6 and 7) For example, the average pmpm costs of treating children (ages 0-20) with asthma varied from a low of \$152.79 in Wilson County to a high of \$402.80 in Buncombe County, with a statewide average of \$286.06. The average pmpm costs for adults with diabetes (19 or older) varied from \$609 in Halifax County to \$1,160.00 in Surry County, with a statewide average of \$858.75. If the CCNC program could help reduce pmpm costs of the higher-than-average cost counties, the state could significantly reduce

Figure 36. Cost Savings Projections

	Number of People Enrolled in ACCESS (2002)	PMPM Cost ACCESS (2002)	Total Monthly Cost ACCESS Population (2002)	PMPM Cost for CCNC Population (2002)	ACCESS population (2002) * PMPM for CCNC population (2002)	Potential Monthly Savings if ACCESS population had PMPM for CCNC (2002)	Potential Yearly Savings if ACCESS population had PMPM for CCNC (2002)
<i>Asthma</i>							
0-5	2,246	267.22	600,176.12	261.21	586,677.66	13,498.46	161,981.52
6-20	4,702	279.68	1,315,055.36	299.53	1,408,390.06	-93,334.70	-1,120,016.40
21-44	2,532	684.98	1,734,369.36	689.65	1,746,193.80	-11,824.44	-141,893.28
45-64	2,348	1,104.37	2,593,060.76	982.11	2,305,994.28	287,066.48	3,444,797.76
65 & up	409	691.99	283,023.91	653.09	267,113.81	15,910.10	190,921.20
Total	12,237		6,525,685.51		6,314,369.61	211,315.90	2,535,790.80
<i>Diabetes</i>							
0-5	29	644.03	18,676.87	557.75	16,174.75	2,502.12	30,025.44
6-20	478	610.75	291,938.50	606.40	289,859.20	2,079.30	24,951.60
21-44	3,319	832.66	2,763,598.54	852.40	2,829,115.60	-65,517.06	-786,204.72
45-64	8,263	991.21	8,190,368.23	974.63	8,053,367.69	137,000.54	1,644,006.48
65 & up	2,962	614.89	1,821,304.18	544.92	1,614,053.04	207,251.14	2,487,013.68
Total	15,051		13,085,886.32		12,802,570.28	283,316.04	3,399,792.48
<i>Asthma & Diabetes Combined</i>							
0-5						16,000.58	192,006.96
6-20						-91,255.40	-1,095,064.80
21-44						-77,341.50	-928,098.00
45-64						424,067.02	5,088,804.24
65 & up						223,161.24	2,677,934.88
Total						494,631.94	5,935,583.28

program costs. For example, the state could achieve as much as \$30 million in additional savings for children with asthma by reducing the high-cost counties to the state average. Similarly, the state could achieve \$28.8 million in additional savings for adults with diabetics if the average pmpm costs in the high-cost counties could be reduced to the current statewide average. However, over time there may be a tendency to see a regression to the mean, that is for the lower cost counties to approach the statewide mean costs. In that case the potential for savings from reducing high cost counties is diminished.

Although there is potential for greater cost savings if the CCNC program adopts cost patterns of the lower cost counties these savings may be difficult to achieve. Simply sharing information with physicians in high cost areas about their costs and comparing them to others often results in defensiveness and claims that the higher cost patients are simply sicker. Understanding the reasons for the differences in the practice patterns in high cost areas is also challenging. Practice patterns are often rooted in long standing traditions of how decisions are made on when to treat a patient, and with what regimens, and these patterns of decision making are not easily changed. Furthermore, the success of the CCNC program is largely dependent on the cooperation of primary care providers, who must be willing to follow the prescribed practice guidelines and disease management initiatives. To date, the CCNC program has primarily operated in communities in which the providers voluntarily chose to participate—presumably, these are the providers who are most committed to the program goals. These are providers who have expressed a willingness to follow new treatment guidelines, to work closely with case management staff, and to have their caseloads closely monitored to determine if they were adhering to practice guidelines. If the Medicaid program attempts to force reductions in practice variations among the program sites, it may lose the cooperation of participating providers. Further, as the Division of Medical Assistance expands the CCNC program statewide, there may not be the same level of physician commitment in the areas that move into the CCNC program. It is unclear whether the program will be as successful if there is not a local physician champion, or the same level of “buy-in” from primary care physicians.

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APPENDICES

Appendix 1. Inclusion Criteria for Disease Management

DMA Criteria for Inclusion in Asthma Initiative:

1. Enrollee had an ED visit with a primary diagnosis of asthma
2. Enrollee had an inpatient visit with a primary diagnosis of asthma
3. Enrollee had the fourth primary care contact (physician, outpatient) all with primary diagnoses of asthma; or
4. Enrollee met the HEDIS prescription requirement (120 days of prescribed asthma medication) plus one primary care contact with an asthma diagnosis.

DMA Criteria for Inclusion in Diabetes Initiative:

1. Enrollee had an ED visit with a primary diagnosis of diabetes
2. Enrollee had an inpatient visit with a primary diagnosis of diabetes
3. Enrollee had the second primary care contact (physician, outpatient) all with primary diagnoses of diabetes; or
4. Enrollee met the HEDIS prescription requirement (one or more prescriptions of insulin of hypoglycemics/antihyperglycemics) plus our criteria of at least one primary care contact with a primary diagnosis of diabetes.

Appendix 2. Characteristics of Medicaid Recipients Who Met Asthma Criteria, By Year, By Program Type

	2000				2001				2002			
	ACCESS		CCNC		ACCESS		CCNC		ACCESS		CCNC	
	n	%	n	%	n	%	n	%	n	%	n	%
<u>Sex</u>												
Female	2,586	62.2	750	49.0	6,012	60.6	2,092	45.9	7,297	59.6	2,921	46.6
Male	1,573	37.8	780	51.0	3,908	39.4	2,469	54.1	4,940	40.4	3,349	53.4
<u>Metro Status</u>												
NonMetro	2,240	53.9	560	36.6	5,240	52.8	1,880	41.2	6,581	53.8	2,424	38.7
Metro	1,919	46.1	970	63.4	4,680	47.2	2,681	58.8	5,656	46.2	3,846	61.3
<u>Aid Program</u>												
WorkFirst or TANF	559	13.4	296	19.3	1,359	13.7	799	17.5	1,693	13.8	1,065	17.0
State Foster Child	0	0.0	0	0.0	2	0.0	2	0.0	3	0.0	2	0.0
IV-E Adoption Assistance	2	0.0	3	0.2	5	0.1	7	0.2	7	0.1	8	0.1
Medicaid Aid to Aged	156	3.8	19	1.2	327	3.3	50	1.1	408	3.3	83	1.3
Medicaid Aid to Blind	20	0.5	2	0.1	28	0.3	3	0.1	30	0.2	7	0.1
Medicaid Aid to Disabled	1,885	45.3	429	28.0	3,787	38.2	1,057	23.2	4,323	35.3	1,405	22.4
Medicaid Aid to Families	502	12.1	199	13.0	1,797	18.1	837	18.4	2,455	20.1	1,313	20.9
Medicaid Infant & Children/HealthChoice	995	23.9	579	37.8	2,514	25.3	1,795	39.4	3,216	26.3	2,371	37.8
Medicaid for Pregnant Women	3	0.1	0	0.0	7	0.0	1	0.0	3	0.0	1	0.0
Medicaid for Qualified Medicare Beneficiaries	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0
Special Assistance for Blind	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
State/County Special Assistance to Aged	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2	0	0.0
State/County Special Assistance to Disabled	37	0.9	3	0.2	93	0.9	10	0.2	98	0.8	15	0.2
<u>Age Group</u>												
0-5	738	17.7	468	30.6	1,944	19.6	1,491	32.7	2,246	18.4	1,835	29.3
6-20	1,344	32.3	776	50.7	3,530	35.6	2,381	52.2	4,702	38.4	3,394	54.1
21-44	871	20.9	122	8.0	2,087	21.0	327	7.2	2,532	20.7	517	8.2
45-64	1,052	25.3	145	9.5	2,034	20.5	312	6.8	2,348	19.2	443	7.1
65 & up	154	3.7	19	1.2	325	3.3	50	1.1	409	3.3	81	1.3
Mean Age	27		15		25		13		25		14	
Total	4,159		1,530		9,920		4,561		12,237		6,270	

Source: NC Division of Medical Assistance, July 2003.

Appendix 3. Characteristics of Medicaid Recipients Who Met Diabetes Criteria, By Year, By Program Type

	2000				2001				2002			
	ACCESS		CCNC		ACCESS		CCNC		ACCESS		CCNC	
	n	%	n	%	n	%	n	%	n	%	n	%
<u>Sex</u>												
Female	8,254	77.0	1,407	77.1	10,814	76.3	1,851	74.6	11,433	76.0	2,320	73.5
Male	2,463	23.0	417	22.9	3,355	23.7	629	25.4	3,618	24.0	836	26.5
<u>Metro Status</u>												
NonMetro	6,129	57.2	490	26.9	8,063	56.9	666	26.9	8,741	58.1	793	25.1
Metro	4,588	42.8	1,334	73.1	6,106	43.1	1,814	73.1	6,310	41.9	2,363	74.9
<u>Aid Program</u>												
WorkFirst or TANF	300	2.8	66	3.6	378	2.7	84	3.4	473	3.1	132	4.2
Medicaid Aid to Aged	1,839	17.2	284	15.6	2,547	18.0	397	16.0	2,952	19.6	542	17.2
Medicaid Aid to Blind	96	0.9	18	1.0	120	0.8	21	0.8	115	0.8	29	0.9
Medicaid Aid to Disabled	7,262	67.8	1,203	66.0	9,161	64.7	1,559	62.9	9,356	62.2	1,917	60.7
Medicaid Aid to Families	752	7.0	141	7.7	1,312	9.3	244	9.8	1,440	9.6	325	10.3
Medicaid Infant & Children/HealthChoice	136	1.3	71	3.9	206	1.5	116	4.7	231	1.5	124	3.9
Medicaid for Pregnant Women	1	0.0	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0
Medicaid for Qualified Medicare Beneficiaries	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0
Special Assistance for Blind	0	0.0	1	0.1	0	0.0	2	0.1	0	0.0	2	0.1
State/County Special Assistance to Aged	0	0.0	0	0.0	0	0.0	0	0.0	6	0.2	1	0.0
State/County Special Assistance to Disabled	331	3.1	40	2.2	444	3.1	57	2.3	477	3.2	84	2.7
<u>Age Group</u>												
0-5	23	0.2	10	0.5	32	0.2	29	1.2	29	0.2	31	1.0
6-20	272	2.5	129	7.1	413	2.9	216	8.7	478	3.2	271	8.6
21-44	2,323	21.7	390	21.4	3,190	22.5	538	21.7	3,319	22.1	668	21.2
45-64	6,257	58.4	1,010	55.4	7,982	56.3	1,297	52.3	8,263	54.9	1,642	52.0
65 & up	1,842	17.2	285	15.6	2,552	18.0	400	16.1	2,962	19.7	544	17.2
Mean Age	53		50		53		59		53		50	
Total	10,717		1,824		14,169		2,480		15,051		3,156	

Source: NC Division of Medical Assistance, July 2003.

Appendix 4. 2001 Age Adjustment, Asthma

Age Cohort	CCNC pmpm	ACCESS age distribution (%)	PMPM
0-5	\$312	19.6	\$61.15
6-20	\$336	35.6	\$119.62
21-44	\$713	21	\$149.73
45-64	\$969	20.5	\$198.65
65 +	\$615	3.3	\$20.30
<i>Total PMPM, Age Adjusted</i>			\$549.45

Appendix 5. 2000 Age Adjustment, Asthma

Age Cohort	CCNC pmpm	ACCESS age distribution (%)	PMPM
0-5	\$357	17.75	\$63.37
6-20	\$311	32.3	\$100.45
21-44	\$795	20.95	\$166.55
45-64	\$953	25.3	\$241.11
65 +	\$561	3.7	\$20.76
<i>Total PMPM, Age Adjusted</i>			\$592.24

Appendix 6. Average PMPM for CCNC, Persons with Asthma, 2002, By County

County	Number Enrollees	PMPM Cost (lowest to highest)
Wilson	1,639	152.79
Craven	1,350	155.71
Scotland	1,270	155.99
Wayne	3,070	192.66
Forsyth	3,359	203.89
Davidson	1,767	208.92
Onslow	3,007	212.81
Guilford	3,912	228.20
Henderson	1,115	236.31
Iredell	1,008	248.29
Edgecombe	1,389	264.42
Rowan	1,452	273.42
Pitt	3,467	290.60
Burke	1,287	291.45
Lenoir	2,076	295.68
Haywood	1,163	322.58
Durham	2,468	337.64
Beaufort	1,442	346.33
Cleveland	1,559	355.92
Gaston	2,273	368.51
Robeson	4,604	370.35
Cabarrus	1,262	375.79
Buncombe	3,386	402.80

Source: NC Division of Medical Assistance DRIVE data, February 2003.

Appendix 7. Average PMPM for CCNC, Persons with Diabetes 2002, By County, 2002		
County	Number Enrollees	PMPM Cost (lowest to highest)
Halifax	3,081	608.57
North Hampton	1,202	658.52
Edgecombe	2,727	681.43
Guilford	2,406	782.46
Pitt	5,402	811.00
Buncombe	2,071	833.26
Durham	1,167	833.63
Forsyth	4,496	864.73
Cabarrus	1,628	876.74
Gaston	2,226	894.69
Henderson	1,056	903.31
Cleveland	1,890	953.90
Surry	1,145	1,160.00

Source: NC Division of Medical Assistance DRIVE data, February 2003.