

March 2014

# Medicare Health Care Quality (MHCQ) Demonstration Evaluation North Carolina Community Care Networks

## Final Year 2 Evaluation Report

Prepared for

**Normandy Brangan**  
Centers for Medicare & Medicaid Services  
The Center for Medicare and Medicaid Innovation  
Mail Stop WB-06-05  
7500 Security Boulevard  
Baltimore, MD 21244

Prepared by

**Michael Trisolini, PhD, MBA**  
**John Kautter, PhD**  
**Asta Sorensen, MA**  
**Joseph Burton, MS**  
**Cordon Newhart, MA**  
**Jenya Kaganova, PhD**  
**Aleksandra Petrovic, BS**  
**Meghan Howard, BA**  
RTI International  
3040 E. Cornwallis Road  
Research Triangle Park, NC 27709

RTI Project Number 0209853.030.000.004



*[This page intentionally left blank.]*

MEDICARE HEALTH CARE QUALITY (MHCQ) DEMONSTRATION EVALUATION:  
NORTH CAROLINA COMMUNITY CARE NETWORKS

FINAL YEAR 2 EVALUATION REPORT

By:

Michael Trisolini, PhD, MBA  
John Kautter, PhD  
Asta Sorensen, MA  
Joseph Burton, MS  
Cordon Newhart, MA  
Jenya Kaganova, PhD  
Aleksandra Petrovic, BS  
Meghan Howard, BA

Federal Project Officer: Normandy Brangan

RTI International

CMS Contract No. HHSM-500-2005-00029I

August 2013

Revised December 2013

Finalized March 2014

This project was funded by the Centers for Medicare & Medicaid Services under contract no. HHSM-500-2005-00029I. The statements contained in this report are solely those of the authors and do not necessarily reflect the views or policies of the Centers for Medicare & Medicaid Services. RTI assumes responsibility for the accuracy and completeness of the information contained in this report.

*[This page intentionally left blank.]*

## CONTENTS

Executive Summary .....	1
Section 1 Introduction.....	13
1.1 Objectives and Structure of This Report.....	14
1.2 NC-CCN Evaluation Methods .....	14
Section 2 Analysis.....	17
2.1 Administration and Infrastructure.....	17
2.2 Health Information Technology.....	19
2.3 Provider and Beneficiary Participation.....	22
2.4 Cost and Savings.....	33
2.5 Quality.....	38
2.6 Utilization .....	41
Section 3 Lessons Learned and Implications for Future Programs .....	45
References.....	49

## LIST OF TABLES

ES-1 Medicare Health Care Quality Demonstration sites .....	1
1 Medicare Health Care Quality Demonstration sites .....	14
2 Numbers of site visit interviewees, by type of protocol .....	16
3 Changes in participating physician practices and providers from PY1 to PY2.....	23
4 Beneficiary assignments and exclusions for the BY and PY2.....	29
5 CMS assigned beneficiaries by demographics and disease subgroups, for the BY and PY2 and for the IG and CG.....	30
6 NC-CCN CMS-assigned beneficiaries by utilization and expenditures for the BY and PY2 and for the IG and CG.....	31
7 Financial outcomes: Multivariate regression analysis results for per-capita expenditures .....	35
8 Financial outcomes: Multivariate regression analysis results for subgroup analyses for per-capita expenditures.....	36
9 Financial outcomes: Multivariate regression analysis results for expenditure components for per-capita expenditures .....	37
10 NC-CCN MHCQ demonstration quality measures, PY2 targets, and quality performance in PY2 relative to targets .....	38
11 Demonstration impact on quality outcomes—multivariate regression results for five claims-based quality measures .....	41
12 Utilization outcomes: Summary of statistical analysis results for hospital admissions, emergency department visits, and 30-day readmissions .....	43

*[This page intentionally left blank.]*

## EXECUTIVE SUMMARY

### Introduction

The Medicare Health Care Quality (MHCQ) Demonstration was developed to address concerns about the U.S. health care system, which typically fragments care while also encouraging both omissions in and duplication of care. To rectify this situation, Congress directed the Centers for Medicare & Medicaid Services (CMS) to test major changes to the health care delivery and payment systems to improve the quality of care while also increasing efficiency across the health care system.

Four sites have participated in the MHCQ demonstration at various time periods (see **Table ES-1**). Because each MHCQ demonstration site has a different and self-defined plan for its intervention, the evaluation of each site is presented in a separate report.

**Table ES-1**  
**Medicare Health Care Quality Demonstration sites**

Participating site	Focus of the MHCQ demonstration	Date of implementation	End date
Indiana Health Information Exchange (IHIE)	Quality Health First program	July 1, 2009	January 31, 2013
North Carolina Community Care Networks (NC-CCN)	Medical home program for dually eligible Medicare-Medicaid enrollees	January 1, 2010	December 31, 2012
Gundersen Health System (GHS)	Advanced disease coordination program	February 1, 2010	April 30, 2014
Meridian Health System (MHS)	Meridian Care Journey program	July 1, 2012	June 30, 2016

SOURCE: RTI International.

This Year 2 evaluation report reviews both quantitative and qualitative evaluation data regarding the structure, goals, and performance of the NC-CCN demonstration. Quantitative information includes descriptive statistical profiles and multivariate statistical analysis of demonstration impacts on cost, quality, and utilization. For these analyses, the evaluation used the same intervention and comparison groups that the implementation contractor used for the financial reconciliation analysis to maintain consistency between the two analyses. The methodology for determining the comparison group is outlined in more detail in NC-CCN's demonstration protocol. The counties found to be most similar to the demonstration area and agreed upon with NC-CCN in their demonstration protocol include 18 counties in Georgia, 19 counties in Kentucky, 12 counties in South Carolina, 9 in Tennessee, and 20 in Virginia. In each demonstration year (base or performance), a beneficiary is included in the comparison group if he or she had a qualifying treatment<sup>1</sup> from a primary care provider, resides in one of the comparison counties, and is dually eligible for Medicare and Medicaid.

<sup>1</sup> A qualifying treatment is a treatment billed using an evaluation and management CPT code for office or other outpatient services, nursing facility services, or domiciliary, rest home, or other custodial care services.

The qualitative data focus on RTI International's site visits to NC-CCN from October 2012 through February 2013, NC-CCN's reports to CMS for its MHCQ implementation contract, and internal site-specific analyses and reports on demonstration and related implementation and performance assessment efforts.

## **Administration and Infrastructure**

NC-CCN is a nonprofit organization established in May 2006 as an outgrowth of Community Care of North Carolina (CCNC), a Medicaid medical home program. The new NC-CCN organizational structure served as a vehicle for participation in the MHCQ demonstration because the demonstration required a contractual relationship with an entity representing the provider networks, and governmental organizations like CCNC were not eligible to apply. However, there was no substantive differentiation between these two organizations and their staff, and they were referred to interchangeably by NC-CCN/CCNC staff, networks, and providers. The NC-CCN MHCQ demonstration was intended as a 5-year project that began in 2010 and was scheduled to end in 2014, but NC-CCN decided to withdraw from the MHCQ demonstration as of December 2012. The NC-CCN MHCQ demonstration included beneficiaries who were dually eligible for both Medicare and Medicaid. Medicaid-only beneficiaries were required to enroll with CCNC, but enrollment with CCNC was optional for beneficiaries dually eligible for both Medicare and Medicaid.

NC-CCN/CCNC continued to provide administrative oversight to the 8 CCNC networks participating in the MHCQ demonstration in performance year 2 (PY2). The administrative structure of the 14 CCNC networks did not change during the MHCQ demonstration. Historically, the 14 networks contracted individually with the N.C. Division of Medical Assistance (NC DMA), which allowed for network-specific autonomy.

In PY2, the networks continued efforts begun earlier in the MHCQ demonstration to embed care managers in high-volume practices and hospitals to assist with care transitions and to help practices identify patients who could benefit from care management services. NC-CCN staff noted in comments to the evaluation team that practices were increasingly hiring their own care managers, in addition to utilizing network care managers, to expand their care management capacity. Two practices hired their own nurse care managers to complement the activities of the CCNC care managers. To increase coordination and documentation across the many types of care managers, the CCNC Case Management Information System (CMIS) was opened up to non-CCNC health department, hospital-based, and practice-based care managers in 2011.

To meet the needs of the MHCQ demonstration, NC-CCN and network staff trained care managers, social workers, and clinical pharmacists about Medicare benefits. Network staff also facilitated relationships between networks and Medicare-oriented community organizations, such as disability resource centers and agencies on aging. Staff at four MHCQ-participating networks were interviewed by the evaluation team in PY2, and they reported that they were training staff on patient safety issues that were especially relevant to the Medicare population (e.g., falls prevention, polypharmacy, palliative care coordination), in addition to offering refreshers on topics like congestive heart failure (CHF).



NC-CCN, practice, and network staff reported to the evaluation team that polypharmacy issues in the dually eligible population required heightened medication management activities and increased pharmacy staff for the MHCQ demonstration. To address a shortage of clinical pharmacists reported in performance year 1 (PY1), NC-CCN coordinated efforts across networks to fund part-time community pharmacists, including several working in retail pharmacies, to assist in providing medication therapy management for patients. NC-CCN reported at the time of the site visit that their networks had on staff network-level pharmacists, clinical pharmacists, behavioral health pharmacists, and pharmacy technicians.

### **Health Information Technology**

NC-CCN staff reported to the evaluation team that they used internal information systems developed by CCNC before the MHCQ demonstration began, but they made MHCQ demonstration-specific modifications to the systems. Through the CMIS, Pharmacy Home system, and informatics reports, NC-CCN channeled data to network staff and providers to facilitate targeted interventions.

NC-CCN staff reported to the evaluation team that the CMIS is a user-built dataset designed in 2001 to provide care managers with direct access to patient data. Through CMIS, care managers can access demographic and claims data for all N.C. Medicaid enrollees regardless of their enrollment status. Patient records within CMIS help to ensure continuity of care because patient records remain the same regardless of the patient's geographic location or change in eligibility status. The CMIS provides care managers with a consistent source for documenting care management interventions, assessments, care plans, and other activities. However, NC-CCN and network staff reported that documentation among staff has not yet been standardized, resulting in variation at the staff member and network levels.

The Pharmacy Home data system aggregates information on drug use that serves network pharmacists, care managers, and primary care providers (PCPs). It provides patient-level information on medication history for point-of-care activities and population-based reports to identify patients who may benefit from clinical pharmacy and care management services. Pharmacy Home was updated to allow providers, pharmacists, and care managers to generate notes, send messages, and enter a clinical narrative into a patient's record, whereas the system previously could only summarize claims data.

Although a complete pharmacy claims history is available within several weeks of the fill date for Medicaid-only beneficiaries, NC-CCN lacked Medicare Part D data for dually eligible patients during PY1 and PY2 of the MHCQ demonstration. In October 2012, NC-CCN had received Part D data for all NC dually eligible patients going back to 2007. Having just received the data, in 2012 site visit interviews they could not report on the usability of the Part D data.

NC-CCN reported that it used Medicare claims and chart audit data in PY1 and PY2 for internal data reporting and for preparing reports to CMS for the MHCQ demonstration. These informatics reports included the following:

- Emergency Department (ED) Visit Report—listed all ED visits for MHCQ dually eligible beneficiaries and provided ED visit summary counts by patients.

- Inpatient Visit Report—listed all inpatient services for dually eligible beneficiaries and provided inpatient services summary counts by patient.
- 646 Patient List Report—provided patient-level information on dually eligible beneficiaries in the MHCQ demonstration, with 80 data elements on demographics, costs, utilization, diagnoses, care management status, and priority status for care manager assessment.
- Summary Statistics Report—summarized patient demographics, costs, utilization rates, disease prevalence, and care management status at the county or network level.

NC-CCN staff reported to the evaluation team that they received direct admission, discharge, and transfer (ADT) data feeds from about two-thirds of the major hospitals in the state, and they were continuing to sign agreements with additional hospitals. Networks historically received fax feeds from some hospitals for Medicaid patients only, but the newer ADT feeds built on the North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT). These data feeds were reported by NC-CCN to be particularly advantageous for identifying high-risk, high-utilizer patients for care management services.

### **Provider and Beneficiary Participation**

**Provider Participation.** The number of NC-CCN MHCQ demonstration participating practices increased by 5 percent from PY1 to PY2, with 33 new practices joining the demonstration and 22 leaving the demonstration. However, at the same time, the number of participating providers fell by 9 percent, with 95 providers leaving the demonstration and only 10 joining the demonstration during that period. In PY2, the NC-CCN demonstration still had 847 providers participating, but the decline in the number of providers from PY1 was notable.

According to NC-CCN staff, the opportunities for quality improvement and for financial bonuses (if Medicare savings were achieved) were two of the main factors that motivated providers to participate in the MHCQ demonstration. All of the providers interviewed by the evaluation team indicated that quality improvement of services for dually eligible beneficiaries was the most appealing aspect of MHCQ participation. Staff at one network reported to the evaluation team that local providers had voiced interest in working with dually eligible beneficiaries because they are a high-need patient population.

Several physicians reported to the evaluation team that physician leadership at the network level was “extremely important” and drove community physician buy-in for the MHCQ demonstration. Most providers had communicated with network medical leadership or other NC-CCN physician leaders when deciding to join the demonstration.

**Beneficiary Participation.** NC-CCN staff reported to the evaluation team that MHCQ beneficiaries assigned by CMS who were enrolled with a CCNC practice were aware that they were linked to a medical home, but they had no knowledge of their provider’s participation in the MHCQ demonstration. NC-CCN staff emphasized the importance of patients choosing their medical homes (as opposed to being assigned to them), as patients who chose their medical home

were much more receptive to its services, particularly to care management and clinical pharmacy services.

Care managers reported to the evaluation team that dually eligible beneficiaries were easier to engage than other populations, because they did not work and could be contacted during regular business hours. Care managers also reported that dually eligible beneficiaries were more willing to talk about their health care; they were open and trusting. In addition, because their health needs were so complex, they welcomed additional help in managing their health. NC-CCN staff noted that older beneficiaries were not as comfortable using telehealth devices and other “tech-savvy” health resources, but they appreciated the regular home visits and telephone calls from care managers.

For this demonstration, intervention group (IG) beneficiaries were identified using a “one touch” assignment (attribution) algorithm agreed upon by CMS and NC-CCN, meaning that beneficiaries had to have at least one primary care visit with a participating provider. Descriptive statistics for CMS-assigned beneficiaries indicated that both the IG and the comparison group (CG) had very large numbers of CMS-assigned beneficiaries for statistical analysis in the base year (BY), PY1, and PY2. In PY2, they totaled 52,966 for the IG and 103,150 for the CG. More than half of the assigned beneficiaries were age 65 or older, although more than 44 percent were younger than age 65. About two-thirds of the beneficiaries were females. More than half (55 percent) of the beneficiaries were eligible for Medicare because they were aged, and about 42 percent were eligible for Medicare because of disability. These patterns were consistent across the BY, PYs, IG, and CG. They are also similar to the national demographic and Medicare eligibility patterns in the dually eligible Medicare population, which has a similar percentage of dually eligible beneficiaries who are younger than age 65 (43 percent), although the national data show a slightly lower percentage of dually eligible beneficiaries who are females (61 percent).

CMS-assigned beneficiaries included more than 36 percent with diabetes and more than 20 percent with chronic obstructive pulmonary disease (COPD). Across the different beneficiary subpopulations, more than 17 percent had vascular disease, more than 18 percent had Congestive Heart Failure (CHF), and more than 8 percent had cancer. As expected, the NC-CCN dually eligible beneficiaries had higher percentages of most of these chronic diseases than the overall national Medicare beneficiary population, which has 28 percent with diabetes, 12 percent with COPD, and 16 percent with CHF. The national percentage with cancer is about the same, at 8 percent.

Descriptive statistics on utilization and expenditures show that beneficiaries in the IG had a consistent average of 10–11 office or other outpatient evaluation and management (E&M) visits per year between the BY and PY2, whereas members of the CG had a similar range of about 9–10 office or E&M visits per year, on average.

Hospital admissions also showed a consistent pattern across the IG and CG and over time, ranging from 570 to 600 admissions per 1,000 beneficiaries. The number increased slightly in the IG from the BY through PY2; there was no increase in the CG. The pattern for 30-day readmissions showed little change over time for both the IG and CG. Emergency department visits per 1,000 beneficiaries increased slightly for both the IG and CG over time.

On average, CMS-assigned beneficiaries in the IG had about \$13,700 in the BY and \$14,700 in PY2 in Medicare expenditures per year. For the CG, spending was slightly lower, at about \$12,800 in the BY and \$13,600 in PY2 in Medicare expenditures per year. There is a general trend of increasing expenditures over time, which is consistent with the nationwide pattern of general medical care cost increases over time. However, these are descriptive data. The multivariate statistical analysis presented in the next section evaluates the impact of the MHCQ demonstration on costs in comparison to the CG and with statistical controls for a number of factors that could affect costs.

## **Cost and Savings**

Several multivariate analyses were conducted on the impact of the NC-CCN MHCQ demonstration intervention on annualized Medicare expenditures per beneficiary. These multivariate regression analyses were weighted by propensity scores to balance the IG and CG populations. They also control for other variables, including hierarchical condition category (HCC) risk score, age, gender, Medicaid eligibility status, Medicare eligibility status, and race. For the main NC-CCN MHCQ demonstration effect, per-capita costs for the IG were estimated to decrease between the BY and PY2 compared with the CG during the same time period (-\$169), but the effect was not statistically significant at the 5 percent level. It was close, with statistical significance at the 5.6 percent level, but it did not achieve the usual standard of statistical significance at the 5 percent level.

To test whether Medicare savings would have occurred if beneficiaries were assigned on the basis of a plurality of touches with an NC-CCN practice, as opposed to the one-touch rule used for beneficiary assignment for NC-CCN in the MHCQ demonstration, another analysis was done as a sensitivity test with the reassigned beneficiaries. A plurality assignment methodology similar to the methodologies used in the CMS Physician Group Practice Demonstration and in the Medicare Shared Savings Program Accountable Care Organization program was used with the NC-CCN MHCQ demonstration beneficiaries. The results of this sensitivity analysis found that per-capita costs for the IG were again estimated to decrease between the BY and PY2 compared with the CG during the same time period (-\$183), but the effect was not statistically significant at the 5 percent level.

A second sensitivity test evaluated an alternate definition for the IG that included only beneficiaries who were both assigned to NC-CCN for the MHCQ demonstration and also enrolled in CCNC's Medicaid medical home program. This sensitivity analysis found that per-capita costs for the IG decreased by \$654 between the BY and PY2 compared with the CG during the same time period, and the effect was statistically significant at the 0.1 percent level. This represents a favorable effect of the MHCQ demonstration for this subset of the assigned beneficiaries who were also enrolled in CCNC's Medicaid program. The size of the effect is notable, at \$654 per beneficiary, and the strong level of statistical significance is also notable, at the 0.1 percent level. As described above, enrollment in CCNC is voluntary for dually eligible beneficiaries, so this is a subgroup of the main demonstration IG. IG beneficiaries also enrolled in CCNC totaled 27,657 in PY2. Propensity score analysis was conducted independently for this multivariate statistical analysis sensitivity test to balance this IG subgroup with the CG.

Multivariate regression analysis was also conducted to evaluate the impact of the main NC-CCN demonstration intervention on expenditures by beneficiary subgroups. Only a few statistically significant effects were found. Of the 13 subgroups analyzed, statistically significant intervention effects were found for 3 subgroups, including vascular disease, end-stage renal disease (ESRD), and beneficiaries eligible for Medicare because of disability. For each of these subgroups, the per-capita costs declined for the IG compared with the CG, which represent favorable effects of the NC-CCN MHCQ demonstration. The size of the ESRD subgroup effect is notable, at \$4,056 in savings per beneficiary, and its level of statistical significance is also notable, at the 1 percent level. Higher levels of savings may be possible for ESRD beneficiaries since they have much higher average costs than the average costs for dually eligible beneficiaries overall.

Multivariate statistical analysis was also conducted to evaluate the impact of the main NC-CCN demonstration intervention effect on expenditure by types of Medicare services and their associated Medicare claims data expenditure components. Of the 10 components analyzed, statistically significant intervention effects were found for two, Outpatient Institutional and Part B Physician/Supplier. For the Outpatient Institutional component, the per-capita costs increased for the IG compared with the CG, which represents an unfavorable effect of the NC-CCN MHCQ demonstration. For the Part B Physician/Supplier component, the per-capita costs declined for the IG compared with the CG.

## **Quality**

NC-CCN staff reported that they implemented 7 new quality measures for the MHCQ demonstration in PY2 in addition to the 18 quality measures from PY1. NC-CCN reported meeting targets for 23 of the 25 PY2 quality measures. The targets used for the MHCQ demonstration were developed from nationally recognized standards where available, including the National Committee for Quality Assurance (NCQA) Diabetes Recognition Program Performance Goals and the NCQA Heart Stroke Recognition Program. No nationally recognized standard was available for 4 of the 25 measures. For those 4 measures, the target was set at a flat rate of 90 percent for claims-based measures or at 90 percent of a 2010 baseline rate.

Multivariate statistical analysis of the impact of the NC-CCN demonstration on quality of care was conducted for this evaluation for five Medicare claims-based quality measures. These claims-based measures enable the analysis to assess NC-CCN's quality performance in relation to the CG, since quality measure performance results can also be calculated for the CG using Medicare claims data.

These multivariate regression analyses used logistic regression models because they have binary dependent variables. They also included control variables for HCC risk scores, age, gender, Medicaid status, Medicare eligibility status, and race. Separate logistic regression analyses were conducted for the following quality measures:

- Glycated hemoglobin (HbA1c) testing once a year for beneficiaries with diabetes.
- Low-density lipoprotein testing once a year for beneficiaries with diabetes.

- Urine protein testing once a year or for evidence of medical attention for nephropathy for beneficiaries with diabetes.
- Lipid profile testing once a year for beneficiaries with coronary artery disease (CAD).
- Beneficiaries hospitalized with a principal diagnosis of heart failure during the current year who also had left ventricular ejection fraction testing during the current year.

The results of these analyses found only one quality measure result that was statistically significant, lipid profile testing for beneficiaries with CAD. That result indicated that the NC-CCN MHCQ demonstration was associated with a higher probability of receiving the indicated care for that measure—a favorable impact of the NC-CCN demonstration on quality of care. However, the results for the other four quality measures were not statistically significant, indicating no effect of the NC-CCN demonstration on quality of care for those measures.

### **Utilization**

Multivariate regression analyses were conducted to evaluate the NC-CCN MHCQ demonstration impact on three utilization measures: hospital admissions, ED visits, and 30-day readmissions. The results indicate that the MHCQ demonstration effects were statistically significant for ED visits for both the predicted number of utilization events and for the overall demonstration effect on utilization. These two effects were both negative, which means the demonstration reduced ED visits, so they represent favorable impacts of the MHCQ demonstration on this utilization measure. However, these reductions in ED visits were not sufficient to produce significant cost reductions, as noted. No statistically significant reductions in utilization were found for hospital admissions or for 30-day readmissions.

### **Lessons Learned and Implications for Future Programs**

A variety of lessons learned and implications for future programs can be gleaned from the results of the NC-CCN MHCQ demonstration in its first two performance years that are the focus of this report.

The quantitative analyses of the NC-CCN demonstration were all conducted in comparison to performance by the CG on the same outcomes. The cost impacts of the demonstration were mixed, with no overall statistically significant cost savings shown for the main NC-CCN MHCQ demonstration, but a sizable and statistically significant cost savings was found for overall expenditures in the sensitivity analysis for beneficiaries who were both assigned to the NC-CCN IG in the MHCQ demonstration and also enrolled in CCNC's Medicaid medical home program.

In addition, statistically significant cost savings were found for 3 of 14 subgroup analyses, including beneficiaries with vascular disease, beneficiaries with ESRD, and disabled beneficiaries. Statistically significant savings was found for one of 10 expenditure component analyses, for the Part B physician/supplier component. However, there was also one expenditure component, the outpatient institutional component, that had significant cost increases, compared to the CG.

The multivariate statistical analysis of quality impacts of the NC-CCN demonstration, in comparison to the CG quality performance, found a statistically significant and favorable impact for only one of the five claims-based quality measures, lipid profile testing for beneficiaries with CAD once per year. No significant impacts were found for the other 4 claims-based quality measures.

In contrast, NC-CCN's self-reported quality measures for the MHCQ demonstration, that were assessed against targets agreed upon with CMS and not against a CG, showed good results with the targets met for 23 of the 25 quality measures. Most of the targets were set using national benchmarks for those quality measures, but these results do not indicate whether or not the same results were achieved by the CG in the absence of the MHCQ demonstration incentives.

The multivariate analysis of utilization impacts of the NC-CCN MHCQ demonstration, in comparison to the CG quality performance, found statistically significant lower utilization for one of the three utilization measures. This significant impact was for ED visits, although the magnitude of this reduction in utilization was not sufficient to result in overall cost savings for the NC-CCN demonstration, as noted.

In sum, several lessons were learned from the multivariate statistical analysis of NC-CCN MHCQ demonstration impacts on cost, quality, and utilization. The key points are as follows:

- The overall cost impact of the NC-CCN demonstration over the first two performance years was not statistically significant at the 5 percent level. It was close, with statistical significance at the 5.6 percent level, but it did not achieve the usual standard of statistical significance at the 5 percent level. One of two sensitivity analyses showed a statistically significant effect, although this was for a subgroup of beneficiaries assigned to NC-CCN and also enrolled in the CCNC Medicaid medical home program, so that was not the main intervention group for this MHCQ demonstration. Future demonstrations should test programs with this alternate type of intervention group definition further, to better assess its potential for reducing costs and improving quality. It may be that this type of more intensive intervention provided to this subgroup is needed to achieve significant impacts on cost and quality outcomes.
- The quality impact analysis results showed improved quality on only one of five quality measures that were assessed against a CG. NC-CCN did meet quality targets for 23 of its 25 self-reported quality measures, but these quality measures were not assessed in the CG, so it is unclear if these targets would have been met in the absence of the demonstration. Future Medicare demonstration projects should emphasize quality evaluation against CGs and not only against targets assessed only for the IG and that may also be achieved in the absence of the demonstration interventions.
- The utilization results showed a statistically significant and favorable effect for one of three utilization measures, which was not sufficient to affect overall cost impact performance for the NC-CCN MHCQ demonstration.

Qualitative analysis and descriptive statistics also provide a number of lessons learned and implications for future programs. Increased provider participation would have been beneficial to the MHCQ demonstration, as providers interviewed by the evaluation team in 2012–2013 generally demonstrated a lack of awareness about the demonstration unless they had leadership roles in CCNC networks or in NC-CCN. Providers rarely attributed specific care delivery activities to the MHCQ demonstration. Most physicians did not distinguish MHCQ demonstration activities from the overall services provided to them through CCNC network affiliation. One physician noted that CCNC and its networks needed to buy some of the physicians' time to establish physician champions in communities and increase awareness and engagement throughout the state at the physician level. Most practices considered the MHCQ demonstration to be one of multiple synergetic activities and sources of funding affecting their patient populations. One provider from a large health system emphasized that other major interventions affecting MHCQ demonstration patients in the system's practice were being implemented by the health system outside of the practice's work with NC-CCN.

Many network staff and providers indicated to the evaluation team that they anticipated savings in later years of the MHCQ demonstration, but few expected early savings to be shown in the cost impact analysis. Generally, interviewees agreed that the dually eligible population was particularly complex and resource intensive. One physician reiterated the complexity of dually eligible patients as a significant barrier to showing early savings: "It takes years to see something change with this patient population, so I did not expect a miracle. We have isolated incidences of great success, but that is not to be counted as overall success."

NC-CCN seemed to be recycling its CCNC interventions with few additional resources devoted to dually eligible beneficiaries due to limited funding or to hopes that they could demonstrate savings under the MHCQ demonstration without much additional effort. Staff of one network explained that they were relying on Medicaid payments to fund their care managers, who were "stretched thin" in having expanded their services to include dually eligible beneficiaries in the MHCQ demonstration without additional funding to support the expansion in services. Site visit participants agreed that more investments in resources and infrastructure were needed at the beginning of the MHCQ demonstration. Future Medicare demonstration projects involving dually eligible beneficiaries should consider up front incentive payments for defined care delivery interventions as a way to ensure that provider involvement and intervention efforts are enhanced significantly enough to provide a good test of the efficacy of the interventions for reducing costs and improving quality.

NC-CCN site-reported data included information on beneficiaries who received one or more types of NC-CCN non-Medicare and non-Medicaid services, but those data were found to be incomplete and recorded in inconsistent ways by different staff, and thus not useful for evaluation purposes. NC-CCN staff indicated that those data were intended for internal operations purposes by care managers, and had not been intended for use in evaluation analysis. Future Medicare demonstration projects should consider ways to ensure that site reported data collected on non-Medicare services that are not recorded in Medicare claims data are collected in a more systematic and comprehensive way so that they can be used for both internal operations purposes by demonstration site staff and also for evaluation purposes by CMS.



NC-CCN staff identified a number of challenges in implementing the MHCQ demonstration that should also be considered in designing future CMS programs. They viewed data delays and attribution issues as barriers to demonstrating cost savings in the MHCQ demonstration. The MHCQ one-touch attribution logic was cited by NC-CCN as a barrier to achieving savings, as it did not identify longitudinal patient-provider relationships and created significant turnover in the attributed beneficiary population from year to year. NC-CCN informatics staff reported that having technical assistance from CMS to understand and work with Medicare data would have helped to resolve some of the data issues early on. They also considered not getting Part D data to be a “big problem” for the MHCQ demonstration because medication fill history information “adds a lot of value in managing patients.”

*[This page intentionally left blank.]*

## SECTION 1 INTRODUCTION

The Medicare Health Care Quality (MHCQ) demonstration was developed to address concerns about the U.S. health care system, which typically fragments care while also encouraging both omissions in and duplication of care. To rectify this situation, Congress directed the Centers for Medicare & Medicaid Services (CMS) to test major changes to the health care delivery and payment systems to improve the quality of care while also increasing efficiency across the health care system. This goal would be achieved through several types of interventions: adoption and use of information technology and decision support tools by physicians and their patients, such as evidence-based medicine guidelines; best practice guidelines; shared decision-making programs; reform of payment methodologies; improved coordination of care among payers and providers serving defined communities; measurement of outcomes; and enhanced cultural competence in the delivery of care.

Section 1866C of the Social Security Act, as amended by Section 646 of the Medicare Prescription Drug, Improvement, and Modernization Act of 2003 (P.L. 108-173, Section 1866C[b]), requires the Secretary of the Department of Health and Human Services to establish a 5-year demonstration, under which the Secretary may approve demonstration projects that examine health delivery factors that encourage improved quality in patient care. This section also authorizes the Secretary to waive compliance with such requirements of Titles XI and XVIII of the Social Security Act (42 U.S.C. 1395 et seq.) as may be necessary for the purposes of carrying out the demonstration project.

Three types of “health care groups” were eligible to participate in the MHCQ demonstration: (1) groups of physicians, (2) integrated health care delivery systems, and (3) organizations representing regional coalitions of groups or systems. The MHCQ demonstration is designed to examine the extent to which major, multifaceted changes to traditional Medicare’s health delivery and financing systems lead to improvements in the quality of care provided to Medicare beneficiaries without increasing total program expenditures.

Four sites have participated in the MHCQ demonstration at various time periods (see **Table 1**). Because each MHCQ demonstration site has a different and self-defined plan for its intervention, the evaluations of each site are presented in separate reports. This report presents evaluation results for the North Carolina Community Care Networks (NC-CCN).

**Table 1**  
**Medicare Health Care Quality Demonstration sites**

Participating site	Focus of the MHCQ demonstration	Date of implementation	End date
Indiana Health Information Exchange (IHIE)	Quality Health First program	July 1, 2009	January 31, 2013
North Carolina Community Care Networks (NC-CCN)	Medical home program for dually eligible Medicare-Medicaid enrollees	January 1, 2010	December 31, 2012
Gundersen Health System (GHS)	Advanced disease coordination program	February 1, 2010	April 30, 2014
Meridian Health System (MHS)	Meridian Care Journey program	July 1, 2012	June 30, 2016

SOURCE: RTI International.

## 1.1 Objectives and Structure of This Report

This Year 2 Evaluation Report for the NC-CCN reviews both quantitative and qualitative evaluation data regarding the site’s structure, goals, and performance.

Section 2 of this report includes the detailed evaluation of NC-CCN using quantitative and qualitative data and analysis. The focus of the quantitative analysis is on multivariate statistical analysis of the impacts of the NC-CCN demonstration on cost, quality, and utilization outcomes. The qualitative analysis describes the goals, governance, and interventions as well as the barriers and challengers that NC-CCN experienced in implementing its demonstration. The qualitative analysis also describes the results of interviews with NC-CCN patients and caregivers regarding their experiences in receiving care from demonstration providers. Section 3 includes conclusions, lessons learned and implications for future programs.

## 1.2 NC-CCN Evaluation Methods

### 1.2.1 Quantitative Analysis

To evaluate improvements in quality, utilization, and costs in the NC-CCN demonstration, it is necessary to specify a comparison group of beneficiaries not subject to the intervention. This enables the evaluation to assess whether the observed effects on quality, utilization, and costs may have happened even in the absence of the demonstration.

We used the same intervention and comparison groups that the implementation contractor used for the financial reconciliation analysis to maintain consistency between the two analyses. The methodology for determining the comparison group is outlined in more detail in NC-CCN’s demonstration protocol. There were two basic steps to match intervention and comparison group beneficiaries. The first step was to identify counties with metropolitan areas that were similar to the counties in NC in regard to the sociodemographic characteristics of their Medicare populations. The counties found to be most similar to the demonstration area and agreed upon with NC-CCN include 18 counties in Georgia, 19 counties in Kentucky, 12 counties in South Carolina, 9 in Tennessee, and 20 in Virginia. The second step was to retrospectively identify beneficiaries in the comparison counties who met the eligibility criteria for the NC-CCN

demonstration. In each demonstration year (base or performance), a beneficiary is included in the comparison group if he or she had a qualifying treatment<sup>2</sup> from a primary care provider, resides in one of the comparison counties, and is dually eligible for Medicare and Medicaid.

Quantitative information includes descriptive statistical profiles and multivariate statistical analysis of NC-CCN demonstration outcomes. The descriptive statistical profiles include the intervention and comparison groups (IG and CG, respectively); base year (BY), performance year one (PY1), and performance year two (PY2) time periods; and data on beneficiary demographic, Medicare enrollment, and disease characteristics. The IG for the NC-CCN MHCQ demonstration is identified by CMS using a one-touch attribution rule calculated using Medicare claims data to provide an objective approach for identifying the IG that does not rely on the site's own data systems.

The multivariate statistical analysis methodology involves two main methods. First, propensity scores are estimated and propensity score weights are applied to the data in order to balance the IG and CG with respect to key beneficiary characteristics before conducting the impact analyses. Second, a multivariate regression model combining data from the BY as well as from PY1 and PY2 is used to estimate the impact of the demonstration on Medicare expenditures, quality, and utilization. This multivariate difference-in-differences regression model estimates the effect of the demonstration on an outcome of interest during the demonstration period after controlling for beneficiary characteristics and time trends throughout the entire observation period. Further details of the statistical analysis methods are included in the MHCQ Demonstration Evaluation Design Report (Trisolini et al., 2013).

### 1.2.2 Qualitative Analysis

The qualitative data in this report includes information provided to RTI during site visits to NC-CCN; through interviews with NC-CCN patients and family members; from NC-CCN's reports to CMS, and internal NC-CCN analyses and reports on demonstration and related implementation and performance assessment efforts.

RTI staff conducted interviews with NC-CCN in person and by telephone between October 2012 and February 2013. RTI staff interviewed individuals representing four of the eight participating NC-CCN networks. The interviews were guided by unique protocols tailored to specific types of interviewees. **Table 2** describes the types and numbers of site visit interviewees, by type of protocol used. The site visit interviews were conducted by teams of two or three RTI staff. The protocols were developed to address the evaluation domains identified in the MHCQ Demonstration Evaluation Design Report (Trisolini et al., 2013).

---

<sup>2</sup> A qualifying treatment is a treatment billed using an evaluation and management CPT code for office or other outpatient services, nursing facility services, or domiciliary, rest home, or other custodial care services.

**Table 2**  
**Numbers of site visit interviewees, by type of protocol**

Interviewee type	Number of interviewees
North Carolina Community Care Networks (NC-CCN) program staff	6
NC-CCN Informatics Center and Clinical Improvement Center staff	4
Network staff	9
Providers	7

SOURCE: RTI International.

We also interviewed five beneficiaries enrolled in the MHCQ demonstration and one caregiver between October 2012 and February 2013. These interviews focused on their experiences with their primary care provider (PCP), staff from their primary care practice, care coordination services, and access to care.

MHCQ enrollees identified by physician practices were contacted by telephone to determine if they were eligible for an interview. Beneficiaries with cognitive or hearing disabilities, an inability to understand the request, or who were currently in the hospital were not eligible to be interviewed. The final set of interviews included two MHCQ dually eligible beneficiaries who were interviewed at their physician’s office in November 2012 and three MHCQ dually-eligible beneficiaries and one caregiver who were interviewed at an adult care home in February 2013. Each interview lasted 30–60 minutes, and the interviewees were compensated with a \$50 CVS or Wal-Mart gift card.

### **1.2.3 Assessing Lessons Learned and Implications for Future Programs**

Assessing lessons learned and implications for future programs relies on several aspects of the NC-CCN evaluation including the quantitative and qualitative data analysis available at this point in the evaluation. The evaluation team has synthesized these analyses to identify key themes, barriers, and opportunities to inform future demonstration projects and the Medicare program.

## SECTION 2 ANALYSIS

This section includes the following topics: administration and infrastructure, health information technology, provider and beneficiary participation, cost and savings, quality, and utilization.

### 2.1 Administration and Infrastructure

**Administration.** NC-CCN is a nonprofit organization established in May 2006 as an outgrowth of CCNC, a Medicaid medical home program. The new NC-CCN organizational structure served as the vehicle for participation in the MHCQ demonstration because the demonstration required a contractual relationship with an entity representing provider networks, and governmental organizations such as CCNC were not eligible to apply. However, there was no substantive differentiation between these two organizations and their staff, and they were referred to interchangeably by NC-CCN/CCNC staff, networks, and providers. The NC-CCN MHCQ demonstration included 8 CCNC networks operating in 26 counties and was intended as a 5-year project. It included beneficiaries who were dually eligible for both Medicare and Medicaid. Medicaid-only beneficiaries were required to enroll with CCNC, but enrollment with CCNC was optional for beneficiaries dually eligible for both Medicare and Medicaid. The NC-CCN MHCQ demonstration began in 2010, and NC-CCN decided to withdraw from the MHCQ demonstration in December 2012.

In PY2, NC-CCN/CCNC continued to provide administrative oversight to the 8 CCNC networks participating in the MHCQ demonstration and the administrative structure of the networks did not change during the demonstration. Some structural changes were anticipated for 2013 about which network staff reported concern to the evaluation team. Historically, the networks individually contracted with the North Carolina Division of Medical Assistance (NC DMA), which allowed for network-specific autonomy. The NC DMA planned to begin contracting with CCNC as a single entity, and the networks would contract directly with CCNC. Several network staff members commented that this new arrangement might translate to more uniform contractual and performance expectations for the networks. One physician voiced concern that the change in structure might threaten network autonomy:

I am nervous about the new structure of CCNC and this contracting through CCNC. This idea of getting the whole state to move this one indicator—well, one group may not want to focus on that. I really hope that we can stay flexible enough to allow for each group to make that choice.

**Infrastructure.** NC-CCN staff reported to the evaluation team that engagement of the dually eligible patient population for the MHCQ demonstration had contributed to an overall growth of infrastructure for NC-CCN and CCNC, expansion of CCNC activities into new settings like nursing facilities and group homes, and increased the focus on mental health and pharmacy resources.

NC-CCN reported in October 2012 that they were adapting their medical home model to long-term care facilities that served residents who were enrolled in CCNC. One MHCQ network

had brought medical home services to SNFs through a single physician practice, although SNF residents could not be enrolled in CCNC at that time. Primary care physicians, nurse practitioners, and care managers provided on-site care in long-term care facilities that had agreed to work with CCNC and its networks. Staff at each of the four MHCQ networks interviewed in PY2 pursued engagement with long-term care facilities to varying degrees. One network added an Aging Continuum Coordinator position for reaching out to local adult care homes and community organizations geared toward the aging population.

Staff from all four MHCQ networks interviewed in fall 2012 noted that overall growth in the CCNC-enrolled population had led to the hiring of new staff in PY2. They reported that growth was not specific to the dually eligible population, but it also included increases in the Medicaid-only aged, blind, or disabled (ABD) patient population. Network staff noted that the dually eligible and ABD patients require more time, resources, and staffing than any other patient populations because of their high needs and complexity. One network hired additional social workers and changed their overall ratio of nurses to social workers to meet the needs of the new patient populations. The network also had to reorganize their care manager assignments to geographic regions as part of joining MHCQ to ensure that no particular care managers were “inundated with all high-need, high-risk” ABD and dually-eligible patients. A staff member of the network noted, “We had to get used to taking care of sick people, super complex patients with many social needs.”

Networks continued to embed care managers in high-volume practices and hospitals to assist with care transitions and to help practices identify patients that could benefit from care management services. NC-CCN staff noted in comments to the evaluation team that, in addition to utilizing network care managers, practices were increasingly hiring their own care managers to expand care management capacity. Two practices hired their own registered nurse care managers to complement the activities of the CCNC care managers. To increase coordination and documentation across the many types of care managers, the CCNC Case Management Information System (CMIS) was opened up to non-CCNC health department, hospital-based, and practice-based care managers in 2011.

To meet the needs of the MHCQ demonstration, NC-CCN and network staff trained care managers, social workers, and clinical pharmacists about Medicare benefits. Network staff also facilitated relationships between networks and Medicare-oriented community organizations, such as disability resource centers and agencies on aging. Every CCNC network maintains a list of community resources on its website. The four MHCQ networks interviewed in PY2 reported that they were training staff on patient safety issues that were especially relevant to the elderly (e.g., falls prevention, polypharmacy) and palliative care coordination, in addition to offering refreshers on topics like congestive heart failure (CHF). One network used staff training offered by the local aging network.

NC-CCN, network staff, and providers reported to the evaluation team that they encounter a high prevalence of coexisting mental illnesses in the dually eligible patient population, resulting in increased attention to a statewide dearth of behavioral health resources. NC-CCN staff noted that their ability to integrate the existing NC mental health services system into their medical home model has been challenging because North Carolina contracts separately with local managed care entities to take care of mental health and substance abuse needs on a



capitated basis. According to NC-CCN, each of its 14 networks had hired a part- or full-time psychiatrist and a full-time behavioral health coordinator “well versed in that community” who could coordinate with providers on a consulting basis. In addition, NC-CCN embedded psychologists and counselors in several rural, high-burden practices and hoped to expand this “co-location” model to other sites. NC-CCN staff noted that despite these efforts, resources to meet the mental health needs of their enrolled patient population were still inadequate.

NC-CCN, practice, and network staff reported to the evaluation team that polypharmacy issues in the dually eligible population required heightened medication management activities and increases in pharmacy staff for the MHCQ demonstration. To address a shortage of clinical pharmacists reported in PY1, NC-CCN coordinated efforts across networks to fund part-time community pharmacists, including several working in retail pharmacies, to assist in providing medication therapy management to CCNC patients. Networks were hiring pharmacy technicians to assist clinical pharmacists with administrative tasks and basic medication therapy management. NC-CCN reported at the time of the site visit that their networks had staff that included network-level pharmacists, clinical pharmacists, behavioral health pharmacists, and pharmacy technicians.

## **2.2 Health Information Technology**

NC-CCN staff reported to the evaluation team that they used internal information systems developed by CCNC before the MHCQ demonstration began, but they made MHCQ demonstration-specific modifications to the systems. Through the CMIS, Pharmacy Home, and informatics reports, NC-CCN channeled data to network staff and providers to facilitate targeted interventions.

NC-CCN staff reported to the evaluation team that the CMIS is a user-built dataset designed in 2001 to provide care managers with direct access to patient data. Through CMIS, care managers can access demographic and claims data for all NC Medicaid enrollees regardless of their enrollment status. However, Medicare data had not been incorporated into the system for MHCQ demonstration for PY1 or PY2. Patient records within CMIS help ensure continuity of care, because patient records remain the same regardless of the patient’s geographic location or change in eligibility status. The CMIS provides care managers with a consistent source for documenting care management interventions, assessments, care plans, and other activities. NC-CCN and network staff reported that documentation among staff had not yet been standardized, resulting in variation in the data entered into the system at the staff member and network levels.

The Pharmacy Home data system aggregates information on drug use that serves network pharmacists, care managers, and PCPs. It provides patient-level information on medication history for point-of-care activities and population-based reports to identify patients who may benefit from clinical pharmacy and care management services. Pharmacy Home was updated to allow providers, pharmacists, and care managers to generate notes, send messages, and enter a clinical narrative into a patient’s record, whereas the system previously could only summarize claims data. The informatics team had not yet created an alert in Pharmacy Home to show that a patient is attributed to the MHCQ demonstration, although there is notation to show that a patient is dually eligible.

Although a complete pharmacy claims history is available within several weeks of the fill date for Medicaid-only beneficiaries, NC-CCN lacked Medicare Part D data for dually eligible patients during PY1 and PY2 of the MHCQ demonstration. NC-CCN noted that timely pharmacy claims allow their pharmacists to identify issues of nonadherence and care gaps for targeted outreach, education, and medication reconciliation. NC-CCN used Surescripts as an alternative source for attributed patients' pharmacy fill history during the MHCQ demonstration. In October 2012, NC-CCN staff reported to the evaluation team that they had received Part D data for all NC dually eligible patients going back to 2007 and reported that they would receive it monthly going forward. Having just received the data, they could not report on the usability of the Part D data in October 2012 interviews.

NC-CCN reported that it used Medicare claims and chart audit data in PY1 and PY2 for internal data reporting and for preparing reports to CMS for the MHCQ demonstration. The informatics reports included the following:

- Emergency Department (ED) Visit Reports—listed all ED visits for MHCQ dual eligibles, and provided ED visit summary counts by patients. Users could sort data by hospital, date of service, paid claim date, PCP, PCP county, care management status, emergent vs. nonemergent status, and care manager.
- Inpatient Visit Reports—listed all inpatient services for dual eligibles and provided inpatient services summary counts by patient. Users could sort by PCP, PCP county, hospital, care manager, care management status, date of service, paid date, and patients with at least one 30-day readmission.
- 646 Patient List Report—provided patient-level information on dual eligibles in the MHCQ demonstration, with 80 data elements on demographics, costs, utilization, diagnoses, care management status, and priority status for care manager assessment. CMS data were incorporated into this report for practices participating in the MHCQ demonstration.
- Summary Statistics Report—summarized patient demographics, costs, utilization rates, disease prevalence, and care management status at the county or network level.

The Quality Measurement and Feedback chart review reports provided practices with access to patient chart audit results. These results included quality measure data not available from claims such as HbA1c values, blood pressure readings, patient weight, and whether foot exams were performed. NC-CCN staff reported that a representative sample of randomized charts was audited for patients with qualifying conditions.

NC-CCN informatics staff reported to the evaluation team that the Medicare claims data feeds from CMS had improved since the beginning of the demonstration, but they would have liked them to be timelier. In addition, NC-CCN staff were concerned that CMS removal of claims with substance abuse diagnoses and treatment procedures from abstracts starting in December 2011 would delete claims used for care coordination. In addition, NC-CCN reported that claims file format changes in March 2011 created delays because the NC-CCN load

programs failed. NC-CCN noted that consistent file formats would reduce delays and system errors.

NC-CCN staff reported to the evaluation team that they received direct admission, discharge, and transfer (ADT) data feeds from about two-thirds of the major hospitals in the state, and they were continuing to sign agreements with additional hospitals. Networks historically received fax feeds from some hospitals for Medicaid patients only, but the newer ADT feeds build upon the North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT). These data feeds were particularly advantageous for identifying high-risk, high-utilizer patients for care management services.

One network reported to the evaluation team that it had outfitted at least 75–100 dually eligible beneficiaries with telehealth equipment over the past 2 years in an effort to increase use of telehealth technology for appropriate patients. In telehealth monitoring, the care manager follows a telephonic coaching protocol with a patient who has a home monitor installed. The network's investment in telehealth equipment had come from their reserve account, but it has become a focus for their participation in the MHCQ demonstration. Patient referrals to telehealth come from the hospital or directly from PCPs. Network staff reported that this intervention had been effective in the past for preventing admissions for CHF and chronic obstructive pulmonary disease (COPD) patients and could be related to overall network changes in utilization patterns.

NC-CCN staff reported that 1,717 individuals in provider offices statewide (including non-MHCQ providers and staff) had direct login access to the Provider Portal in PY2. Although NC-CCN staff noted in comments to the evaluation team that “the more information you can give to a doctor about their entire patient population, they appreciate it,” several providers noted that PCPs generally are overwhelmed by available data and prefer that care managers handle CCNC data feeds. In the words of one physician, “the CCNC Informatics Center is incredible, but we are not going to use it in terms of daily workflow.” Another physician noted that providers may access CCNC data more often if the CCNC systems were integrated with local electronic health records (EHRs), as physicians had to log off their internal systems to log in to Provider Portal. On the other hand, one physician reported that the Provider Portal had been “invaluable” for feedback and communication purposes.

NC-CCN staff reported to the evaluation team that one large practice in a hospital system developed a “homegrown” case management system based on the CMIS through its EHR system. Both CCNC care managers and care managers employed by the practice used the EHR system for documentation. Additionally, anyone with rights to the EHR can communicate through the system. A provider in the practice reported that the challenge with CMIS is that it is “external” to their own systems, whereas their EHR system allows them to communicate internally. The provider explained that a major advantage to using the EHR system for case management was that anyone in the hospital system could see what a case manager had done with a patient.

## **2.3 Provider and Beneficiary Participation**

### **2.3.1 Provider Participation**

According to NC-CCN, the opportunities for quality improvement and for financial bonuses (if Medicare savings were achieved) were two of the main factors that motivated providers to participate in the MHCQ demonstration. Providers indicated to NC-CCN that improving the quality of services for dually eligible patients was the most appealing aspect of MHCQ participation. Staff at one network noted that local providers had voiced interest in working with that population because of their high needs. One network noted that access to Medicare data, which were not previously available, also encouraged providers to participate. However, several providers interviewed were unable to distinguish their participation in the MHCQ demonstration from their involvement in multiple network initiatives.

Several physicians reported to the evaluation team that physician leadership at the network level was “extremely important” and drove community physician buy-in for the MHCQ demonstration. Most providers had communicated with the network medical leadership or other NC-CCN physician leaders when deciding to join the demonstration. NC-CCN continued to send its medical leadership staff to networks and practices in PY2 and PY3 to maintain lines of “doctor-to-doctor” communication and an overall environment of peer-driven change in care delivery.

Providers agreed in comments to the evaluation team that support from CCNC and their network was beneficial to their dually eligible patient populations. MHCQ providers affiliated with CCNC prior to the demonstration already noted that CCNC services were mostly focused on Medicaid patients. One provider explained that a care gap for dual eligibles had been filled by the expansion of CCNC care management, clinical pharmacy, and social work services for dually eligible patients for the MHCQ demonstration: “We already saw patients with Medicare primary insurance, and they didn’t get the services that primary Medicaid population got. We always felt these people really need the case management and intensive care.”

Staff at one network reported to the evaluation team that their providers were awaiting news on Medicare savings in PY1 and PY2, because “they all work really hard and really hope to see something.” NC-CCN staff held a meeting with the networks’ leadership to discuss how they would communicate to physicians that no Medicare savings had yet been achieved. Staff from several networks voiced disappointment in comments to the evaluation team in being unable to announce savings to providers and pay providers for pursuing better care for a difficult patient population. Yet several providers interviewed were unaware that shared savings originally had been proposed in the MHCQ demonstration model. One physician reported that he received extra per-member-per-month payments for patients because he had been accredited as a patient-centered medical home through the National Committee for Quality Assurance. He indicated that he would have preferred that the MHCQ demonstration also incentivize quality improvements in advance, rather than waiting until overall savings occurred.

The quantitative analysis for provider and beneficiary participation includes descriptive statistics from Medicare claims and enrollment data to provide profiles of the NC-CCN MHCQ demonstration providers and assigned beneficiaries. This NC-CCN MHCQ demonstration Year

2 evaluation report includes data on the NC-CCN BY that covered January–December 2009; PY1, that included January–December 2010; and PY2, that covered January–December 2011.

**Table 3** presents data on changes in provider participation from PY1 to PY2. **Table 3** shows that the number of MHCQ demonstration participating practices increased by 5 percent from PY1 to PY2, with 33 new practices joining the demonstration and 22 leaving the demonstration. However, at the same time, the number of participating providers fell by 9 percent, with 95 providers leaving the demonstration and only 10 joining the demonstration during that period. In PY2, the NC-CCN demonstration still had 847 providers participating, but the decline in the numbers of providers from PY1 was notable.

**Table 3**  
**Changes in participating physician practices and providers from PY1 to PY2**

Participating practices and providers	PY1	Dropped in PY2	Added in PY2	PY2	Percent change
Total participating practices	234	22	33	245	5%
Total providers identified by NC-CCN <sup>1</sup>	932	95	10	847	–9%

NOTE:

FQHC = Federally Qualified Health Center; NC-CCN = North Carolina Community Care Networks; PY1 and PY2 = Performance Years 1 and 2, respectively; RHC = Rural Health Clinic.

1. Includes one FQHC/RHC because the column in the participant list is used to mark FQHC/RHC providers.

### 2.3.2 Beneficiary Participation

For the MHCQ demonstration, CMS assigned beneficiaries to participating MHCQ demonstration-participating providers if the beneficiary had at least one qualifying evaluation and management (E&M) visit with that provider during the given performance year. This one-touch attribution rule was applied after the performance year was completed, looking back at the claims data reported for the prior year. This retrospective method kept the attribution accurately focused on patients who did receive services from providers in the demonstration. However, this method also meant that NC-CCN did not receive information on new MHCQ attributed patients during a performance year, and this information was not available to NC-CCN for up to 1 year after the end of the performance year.

NC-CCN staff reported that the “one-touch” attribution model also created barriers to MHCQ population management, as the model did not capture longitudinal patient-provider relationships. They noted that the MHCQ population for which they were responsible has significantly fluctuated, as many patients dropped off the CMS attributed patient list each year as they were seen only by other providers after seeing an NC-CCN provider for at least one visit in the prior year. NC-CCN staff voiced concern that the one-touch attribution methodology included “a substantial number of patients who have only a fleeting, one-time encounter with a participating PCP, but apparently are receiving their longitudinal care elsewhere.” NC-CCN

staff indicated that they preferred a plurality touch model because it would more likely capture longitudinal patient-provider relationships.

NC-CCN staff reported that retrospective attribution created operational difficulties for population management and cost savings analysis. Given the delay in receiving the attributed patient list for PY1, NC-CCN attempted to simulate patient attribution to target its management services to potentially attributed patients while waiting for the CMS list. However, the list they generated was not entirely accurate. NC-CCN reported that the PY2 attribution by CMS was “less painful” because NC-CCN was able to identify and submit the list of participating providers to CMS earlier than for PY1. However, CMS sent a predicted attribution list for PY2 9 months after the start of PY2, so NC-CCN reported that the list still was received too late to enable meaningful use of the data during PY2 for risk segmentation, care gap identification, care management outreach, and quality improvement purposes.

Also, NC-CCN felt that it would have been useful for CMS to include information about the provider to which a patient had been attributed, although this need had not been identified in the original agreement between CMS and NC-CCN. NC-CCN had to determine the patient-provider association for each new MHCQ patient, which was challenging and time-consuming. For more than 10,000 patients in the September 2011 attributed patient file received from CMS, NC-CCN reported that it was unable to determine the attributed provider with Medicaid claims alone. NC-CCN informatics staff reported that, in PY3, CMS identified newly touched patients and sent NC-CCN an updated attribution list every quarter, but no provider information or claims history was included with those patients as previously requested.

**Enrollment.** NC-CCN staff reported that the NC DMA’s policy of optional CCNC enrollment for dually eligible patients continued to present challenges to NC-CCN in engaging and managing MHCQ demonstration beneficiaries. With the NC DMA’s opt-out provision, some dually eligible patients either opted out from CCNC enrollment before their attribution to the MHCQ demonstration or chose to opt out when contacted by CCNC upon being attributed to the MHCQ demonstration. While the CCNC networks reached out to nonenrolled dually eligible patients, NC-CCN’s management of these beneficiaries was limited by patient interest, the lack of sufficient data feeds to NC-CCN from the NC DMA for CCNC nonenrolled patients, or both. NC-CCN staff were also concerned that many dually eligible patients were relying on specialist care and were therefore very difficult to enroll into a CCNC primary care medical home regardless of whether they were attributed to the MHCQ demonstration.

The NC DMA had led statewide efforts to expand CCNC enrollment among all eligible patient populations. In 2011, the NC DMA, NC Hospital Association, and CCNC networks partnered with NC-CCN to enroll as many eligible patients as possible into CCNC, which included dually eligible beneficiaries. One network reported to the evaluation team that they hired patient navigators to locally augment the CCNC enrollment project. Another network worked with staff from local social services departments to explain CCNC enrollment benefits to eligible patients. To overcome challenges with enrollment and attribution for the MHCQ demonstration, NC-CCN advised networks to direct their care managers, clinical pharmacists, and MHCQ providers to engage all dually eligible beneficiaries eligible for CCNC whom they encountered and encourage them to enroll.

Another population that NC-CCN had difficulty enrolling was beneficiaries residing in long-term care facilities. Although skilled nursing facility (SNF) residents cannot enroll in CCNC, several MHCQ networks targeted enrollment efforts at other types of long-term care facilities (such as group homes) in fall 2012 to engage dually eligible beneficiaries for care management services. NC-CCN expected these efforts to help to enroll into CCNC dually eligible beneficiaries in long-term care facilities that had been or might become attributed to an MHCQ provider and to tackle the high emergency department (ED) and hospitalization rates for residents in the facilities. Additionally, the NC DMA had submitted a State Plan Amendment to include SNF residents as eligible for CCNC enrollment in the future.

Despite NC-CCN's concerns about CCNC enrollment status for dually eligible beneficiaries, physicians generally reported to the evaluation team that in their daily practice they made care management referrals and provided appropriate services based on patient needs, regardless of CCNC enrollment status. One CCNC physician from a community health center (CHC) observed that CCNC enrollment efforts might actually boost the CHC's number of paying patients, because the center would begin to receive Medicaid payments upon enrolling eligible patients in CCNC.

NC-CCN staff indicated to the evaluation team that MHCQ assigned beneficiaries who were enrolled with a CCNC practice were aware that they were linked to a medical home, but they had no knowledge of their provider's participation in the MHCQ demonstration. NC-CCN staff emphasized the importance of patients choosing their medical homes (as opposed to being assigned to them), as patients who chose their medical homes were much more receptive to its services, particularly to care management and clinical pharmacy. A physician also noted that patients in his practice were most receptive to care managers when it was clear that they worked with the patient's primary care doctor.

NC-CCN and network staff reported to the evaluation team that the medical home opt-out letters sent to dual eligible patients from the NC DMA caused "a lot of confusion about what it means and what patients need to do." As one network's care managers became "inundated" with questions and concerns from potential enrollees, they created the position of CCNC Benefits Advocate through the local department of social services to discuss and encourage CCNC enrollment with patients.

NC-CCN informatics staff continued to produce priority patient reports that identified more severely ill patients in PY2, and they continued to assist networks (particularly care managers) in allocating network and practice resources. Network staff reported to the evaluation team that these reports were very useful, but that they also placed importance on provider referrals "because they see the patients and really know them." One provider emphasized the importance of having other staff, such as care managers, available to discuss CCNC enrollment with patients identified in a clinical visit, as a doctor has little time to explain the benefits in-depth to a patient. Care managers embedded in practices and hospitals also may engage dually eligible patients being seen at the practice, even if they are not on high-risk lists.

One network reported to the evaluation team that their care managers spent the first 3 months of the MHCQ demonstration calling all of the patients on a projected MHCQ patient list they received from NC-CCN. Simultaneously, the network's clinical pharmacists performed

medication reviews for all of the patients on the list who had 12 or more prescriptions. During those 3 months, the network aimed to touch all projected MHCQ patients of whom they were aware and bring them under management as soon as possible so that it would be easier to handle later waves of attributed patients throughout the demonstration.

Care managers reported to the evaluation team that dually eligible patients were easier to engage than other patient populations, as they did not work and were more easily contacted during regular business hours. Care managers also reported that dually eligible patients were more willing to talk about their health care; they were very open and trusting. In addition, because their health needs were so complex, they welcomed additional help in managing their health. NC-CCN noted that the older patients among the dual eligibles were not as comfortable using telehealth devices and other “tech-savvy” health resources, but they appreciated the regular home visits and telephone calls from care managers.

**Beneficiary Experience of Care.** RTI staff interviewed two NC-CCN MHCQ beneficiaries who were both younger than age 65. They reported having more than seven chronic conditions and rated their health as fair or poor. Each of the beneficiaries had an established relationship with a primary care practice that had lasted for at least 7 years. One beneficiary reported that she always saw the same doctor for her care and had 12 visits in the past year. The other patient explained that she saw residents, so she had seen three different physicians over the course of going to the practice for care, as each physician completed the residency and a new resident took over her care. However, she reported that she nearly always saw her primary physician at the practice unless she had to schedule an urgent visit on a day when her doctor was not in the clinic. She had approximately 10 visits in the past year.

The CCNC medical home model adopted by the MHCQ practice had affected both patients’ experiences with care. Both patients reported that they had received specialist care and that their primary doctors coordinated the care from all of the specialists. One beneficiary, who had a history of substance abuse in addition to several comorbidities, explained that her primary doctor “made sure that all her doctors were talking to each other” and coordinated all prescribed medications. The patient explained that she particularly liked going to the practice for her care because her primary doctor, with whom she has a longstanding, trusting relationship, managed all of her care and “knows everything concerning her conditions.” The beneficiary noted that her doctor was alerted by the EHR system if she had recently visited the ED or had any lab work done and would discuss those things with her. In addition, she appreciated her doctor’s ongoing involvement in all her care: “I went to the [ED] last night and she is already doing an ultrasound to see if it is gallstones and I have another ultrasound at 2:00 p.m. to look at something else. That is why I enjoy her.”

The second patient also reported to the interviewers that her primary doctor was “overseeing all of her care” and communicating directly with all of her specialists to coordinate care. The patient explained that her doctor’s chief concern was that she was on too many medications due to a lack of communication among all of her doctors, and that her primary physician was aiming to decrease her medications through communicating with the specialists. The patient noted that it was particularly important to her to have all of her care “under one roof” with her primary doctor. She also liked that her primary doctor knew whether and why she had



seen another provider for urgent care when an appointment could not be scheduled with her primary doctor.

Both of the patients reported to the interviewers that they were linked to a nurse care manager for additional assistance and care coordination. They reported that the nurse care managers contacted them frequently to “check on them” and see if they needed anything. One of the patients had received several home visits from the nurse care manager to check on her medications and also had received intravenous therapy at home after a hospitalization with the nurse’s assistance. Both patients noted that their care manager always called after they were discharged from the hospital to help with the transition back to home and provided any needed assistance. One patient explained that her nurse care manager also reminded her that she could call when considering an ED visit: “She’ll call when I get home [from the hospital] and see if I need anything. She tells me I can always call her when things get hard. But when times get hard and everything, I don’t think about her, I think about the pain and trying to get out of it.”

One of the patients also reported to the interviewers that her nurse care manager connected her with community resources. The nurse had arranged for her to get a walker and cane, in addition to providing her with an application for a free transportation service. The nurse care manager had also informed her of a free grocery delivery service. She reported that the nurse care managers “have been very helpful.” She also reported that her primary care doctor worked with a clinical pharmacist in the practice to manage her medications and that the pharmacist communicated with her specialists.

Neither of the beneficiaries had noticed any changes in practice hours or in access to care. However, both patients reported that making an appointment to see their primary doctor or communicating with their doctor during normal hours of the practice was easy. Both patients noted that they would be less inclined to visit the ED on weekends if they could go to the internal medicine practice for urgent care on weekends.

A 40-bed adult care home was also visited by RTI staff to interview resident patients attributed to the MHCQ demonstration. As part of the CCNC network’s efforts to provide services to patients in group homes, the adult care home was visited twice monthly by an MHCQ physician from a nearby community health center and two nurse care managers contracted by the network to provide services to dual eligible patients in adult care homes. The nurse care managers served MHCQ patients and worked with CCNC care managers, but they were not directly employed by CCNC. The three patients interviewed at the adult care home were all older than age 75 and each reported having at least one chronic condition.

The beneficiaries all reported to the interviewers that they could not distinguish between care received from the nurse care managers and from the staff within the group home. The three patients agreed that they received good care and liked that nurses and doctors checked on them.

A member of the group home staff was interviewed as a caregiver to provide further understanding of the role of the nurse care managers and MHCQ providers in the residents’ health care. She explained that the nurse care managers, who are employees of the healthcare system affiliated with this group home, call regularly to ask if anyone has been in the hospital. The nurse care managers had given the staff member guidelines that everyone who went to the

hospital needed to be seen by a doctor within 72 hours. The staff member arranged a visit to the community health center for residents who returned from the hospital.

The staff member reported to the interviewers that on-site visits from the physician were particularly helpful in providing the patients with regular care in the comfort of their place of residence. She also noted that the nurse care managers were very helpful: “We probably cut down on ED visits because we can call the nurse case manager and she will tell me what to do. If anything is going on, they take a look before it gets worse. It’s preventative medicine.” She explained that she could contact an after-hours physician from the community health center during nights and weekends for urgent assistance.

**Descriptive Statistics.** Descriptive statistics for CMS assigned NC-CCN beneficiaries are shown in **Tables 4–6** on the following pages. **Table 4** indicates that both the IG and CG had very large numbers of assigned beneficiaries for statistical analysis in the BY, PY1, and PY2. In PY2, they totaled 52,966 for the IG and 103,150 for the CG. The CG is about two times the size of the IG, which adds statistical power for the multivariate statistical analysis of demonstration outcomes that is presented in the following sections.

NC-CCN provided data to the evaluation on beneficiaries who received one or more types of NC-CCN non-Medicare and non-Medicaid services, but those data were found to be incomplete, recorded in inconsistent ways by different staff, and not useful for evaluation purposes. This included data on beneficiaries who received care management services, comprehensive health assessments, home visits, medication reconciliation services, and medication review services. NC-CCN staff indicated that those data were intended for internal operations purposes by care managers, and had not been intended for use in evaluation analysis. Future Medicare demonstration projects should consider ways to ensure that site reported data on non-Medicare services that are not recorded in Medicare claims data are collected in a more systematic and comprehensive way so that they can be used for both internal operations purposes by demonstration site staff and also for evaluation purposes by CMS.

**Table 5** shows that about 55 percent of the CMS-assigned beneficiaries were age 65 or older and about 45 percent were younger than age 65 across all of the groups shown. About two-thirds of the beneficiaries were females. More than half of the CMS-assigned beneficiaries were eligible for Medicare because they were aged, and more than 42 percent were eligible for Medicare because of disability. These patterns were consistent across the BY, PYs, IG, and CG. They are also similar to the national demographic and Medicare eligibility patterns in the dually eligible Medicare population, which show that a similar percentage of national dually eligible beneficiaries are younger than age 65 (43 percent), although the national data show a slightly lower percentage of dually eligible beneficiaries who are females (61 percent) (MEDPAC, 2012).

**Table 4**  
**Beneficiary assignments and exclusions for the BY and PY2**

Assignments and exclusions	BY IG	PY2 IG	BY CG	PY2 CG
1. Beneficiaries covered by Medicaid in the assignment period	313,846	332,099	161,276	173,748
2. Total beneficiaries excluded from assignment <sup>1,2,3,4</sup>	66,032	69,469	40,368	47,279
3. Beneficiaries eligible for assignment (line 1 – line 2)	247,814	262,630	120,908	126,469
4. Intervention group: Beneficiaries with a qualifying patient visit with a participating provider at a participating practice <sup>5,6</sup>	42,422	51,386	—	—
5. Intervention group: Beneficiaries with a qualifying patient visit with a participating provider at a nonparticipating practice	1,721	1,580	—	—
6. Intervention group: Assigned beneficiaries (line 4 + line 5)	44,143	52,966	—	—
7. Comparison group: Beneficiaries eligible for assignment who were provided at least one office or other outpatient E&M service by a primary care provider <sup>7</sup>	—	—	97,345	103,150

NOTES:

CG = comparison group; E&M = evaluation and management; IG = intervention group; MHCQ = Medicare Health Care Quality; NC-CCN = North Carolina Community Care Networks.

Base Year (BY): January 1–December 31, 2009.

Performance Year 2 (PY2): January 1–December 31, 2011.

1. Exclusions are not mutually exclusive. A beneficiary may be excluded for more than one reason.
2. For the BY: October 2008–September 2009; for PY2: October 2010–September 2011.
3. Exclusions during the demonstration period ensure that beneficiaries meet the general eligibility requirements outlined in protocol §2.1.1 during the entire demonstration period, not only during the assignment period.
4. Beneficiaries assigned to the Physician Group Practice Transition Demonstration in PY1 (calendar year 2011) are excluded from NC-CCN BY and PY2 for PY2 financial reconciliation.
5. Beneficiaries for specified practices, specified community health centers (CHCs), and beneficiaries with a qualifying patient visit with participating Federally Qualified Health Centers (FQHCs) or Rural Health Clinics (RHCs) are selected regardless of location of practice.
6. Beneficiaries with a qualifying patient visit with a participating provider both at a participating practice and at a nonparticipating practice are included in this count.
7. Primary care providers include those in family medicine, general medicine, internal medicine, geriatric medicine, as well as physician assistants, nurse practitioners, and clinical nurse specialists who provide primary care services. Visits to FQHCs and RHCs are counted as one E&M visit.

SOURCE: RTI International analysis of October 2008–December 2011 100% Medicare claims files and enrollment datasets.

**Table 5**  
**CMS assigned beneficiaries by demographics and disease subgroups, for the BY and PY2**  
**and for the IG and CG**

Measure	BY IG	PY2 IG	BY CG	PY2 CG
Number of beneficiaries	44,143	52,966	97,345	103,150
Age (%)				
Age < 65	44.2%	45.2%	45.6%	47.2%
Age 65–74	23.2	23.3	24.3	23.9
Age 75–84	20.2	19.3	19.2	18.3
Age 85+	12.4	12.2	10.9	10.6
Gender (%)				
Male	31.7	32.7	33.6	34.6
Female	68.3	67.3	66.4	65.4
Medicare eligibility (%)				
Aged	55.1	53.9	53.6	51.8
Disabled	42.8	43.5	44.2	45.4
End-stage renal disease	2.1	2.6	2.2	2.8
Mean HCC risk score* for upper 10% risk score	6.7	7.3	6.8	7.3
Mean HCC risk score* for upper 25% risk score	4.5	4.9	4.4	4.7
Any of 7 diseases below, %	64.6	66.2	64.9	64.3
Diabetes, %	38.6	40.3	36.8	36.9
Chronic obstructive pulmonary disease, %	20.6	22.2	22.7	22.6
Vascular disease, %	17.2	18.2	20.0	20.5
Congestive heart failure, %	19.1	20.5	18.7	18.2
Cancer, %	9.3	9.5	8.7	8.7
Stroke, %	6.4	6.4	6.6	6.6
Acute myocardial infarction, %	4.0	4.0	4.3	4.2

NOTES:

CG = comparison group; CMS = Centers for Medicare & Medicaid Services; HCC = hierarchical condition category; IG = intervention group; NC-CCN = North Carolina Community Care Networks.

\* Hierarchical condition category (HCC) risk scores represent the severity of illness. The average for the Medicare population, which is set by the HCC risk scoring methodology, is 1.0.

Base Year (BY): January 1–December 31, 2009.

Performance Year 2 (PY2): January 1–December 31, 2011.

SOURCE: RTI International analysis of October 2008–December 2011 100% Medicare claims files and enrollment datasets.

**Table 6**  
**NC-CCN CMS-assigned beneficiaries by utilization and expenditures for the BY, PY1, and PY2 and for the IG and CG**

Measure	BY IG	PY1 IG	PY2 IG	BY CG	PY1 CG	PY2 CG
Mean count of qualified office or other outpatient E&M visits per beneficiary <sup>1</sup>	10.40	8.92	11.02	9.73	7.43	10.13
Hospital admissions per 1,000 beneficiaries <sup>2</sup>	591	576	604	568	544	566
30-day readmission rate (% of beneficiaries)	18.4%	19.0%	18.2%	18.3%	18.7%	18.4%
Emergency department visits per 1,000 beneficiaries	1,539	1,551	1,601	1,395	1,423	1,462
Mean annualized Medicare expenditures per beneficiary per year <sup>3</sup>	\$13,652	\$13,945	\$14,633	\$12,774	\$13,020	\$13,631
Mean annualized Medicare expenditures per beneficiary per month <sup>3</sup>	\$1,138	\$1,162	\$1,219	\$1,064	\$1,085	\$1,136
Percent of beneficiaries with inpatient expenses (%)	30.6	30.0	30.6	29.0	28.0	28.3

NOTES:

CG = comparison group; E&M = evaluation and management; IG = intervention group; MHCQ = Medicare Health Care Quality; NC-CCN = North Carolina Community Care Networks.

Base Year (BY): January 1–December 31, 2009. Performance Year 1 (PY1): January 1–December 31, 2010.

Performance Year 2 (PY2): January 1–December 31, 2011.

1. Qualified E&M visits are listed in §9.1 of the Protocol and are counted regardless of performing provider. Visits to Federally Qualified Health Centers (FQHCs) and to Rural Health Clinics (RHCs) are counted as one E&M visit.
2. Refers to hospital admissions at any provider.
3. Annualized Medicare expenditures per beneficiary are calculated by dividing actual expenditures by the fraction of the year the beneficiary is alive and are capped at the weighted 99th percentile of the claims distribution for beneficiaries without end-stage renal disease (ESRD) and at the weighted 99th percentile of the national claims distribution for beneficiaries with ESRD.

SOURCE: RTI International analysis of October 2008–December 2011 100% Medicare claims files and enrollment datasets.

Table 5 also shows the mean risk scores for the upper 10 percent and upper 25 percent of the hierarchical condition category (HCC) risk score distribution among assigned beneficiaries. These mean scores illustrate how those groups have significantly higher severity of illness than the average for the Medicare population, which is set by the HCC risk scoring methodology at 1.0. As expected, the upper 10 percent group has a higher severity of illness (ranging from 6.7 to 7.3) than the upper 25 percent group (ranging from 4.4 to 4.9).

**Table 5** also shows the percentages of assigned beneficiaries with chronic diseases of interest for the Medicare population—diseases that have high prevalence or high costs. NC-CCN assigned beneficiaries included more than 36 percent with diabetes and more than 20 percent with COPD. Across the IG and CG, more than 17 percent had vascular disease, more than 18 percent had CHF, and more than 8 percent had cancer. As expected, these NC-CCN dually eligible beneficiaries had higher percentages of most of these chronic diseases than the overall national Medicare beneficiary population, which has 28 percent with diabetes, 12 percent with COPD, and 16 percent with CHF, although the national percentage with cancer is about the same at 8 percent (CMS, 2012). Notably, more than 64 percent of the assigned beneficiaries have at least one of the seven chronic diseases highlighted in **Table 5**, across both the IG and CG.

**Table 6** presents descriptive statistics on utilization and expenditures for the assigned beneficiaries. It shows that beneficiaries in the IG had an average of about 10–11 office or other outpatient E&M visits per year, whereas members of the CG had a similar but slightly lower range of about 9–10 office or other outpatient E&M visits per year, on average. For the IG, the number of visits increased from the BY through PY2, but by about the same amount as the increase in the CG.

Hospital admissions also showed a consistent pattern across the IG and CG, ranging from 570–600 admissions per 1,000 beneficiaries. The number of admissions increased slightly in the IG from the BY through PY2, while staying flat for the CG. The pattern for 30-day readmissions showed little change over time for both the IG and CG. Emergency department visits per 1,000 beneficiaries increased slightly for both the IG and CG over time.

**Table 6** also presents data on mean annualized Medicare expenditures per beneficiary. For this NC-CCN evaluation, Medicare expenditures are expressed as per-beneficiary-per-month (PBPM) expenditures or as per-beneficiary-per-year (PBPY) expenditures. Medicare expenditures include all Part A and Part B fee-for-service claims components (inpatient, skilled nursing, outpatient, physician/supplier, home health, durable medical equipment, and hospice). Part D expenditures for pharmaceutical expenses are not included because those claims data were not readily accessible for some of the time periods involved in this demonstration. PBPY expenditures in the baseline and annual performance periods are defined as the sum of Medicare expenditures for the eligible months in that period, and PBPM expenditures are the PBPY amounts divided by the number of eligible months in that period. Expenditures are presented as truncated (capped at the 99th percentile) in **Table 6**. IG and CG observations are weighted by the beneficiary's fraction of eligible months in the demonstration period.

On average, CMS-assigned beneficiaries in the IG had about \$13,700–\$14,700 in Medicare expenditures per year. For the CG, spending was slightly lower at about \$12,800–\$13,600 in Medicare expenditures per year. There is a general trend of increasing expenditures over time, which is consistent with the nationwide pattern of general medical care cost increases over time. However, these are descriptive data. The multivariate statistical analysis presented in the next section evaluates the impact of the NC-CCN MHCQ demonstration on costs in comparison to the CG and with statistical controls for a number of other factors that could affect costs.

**Table 6** also shows the percentage of CMS-assigned beneficiaries who had any inpatient Medicare expenses. This figure is generally consistent across the IG and CG, ranging from 28.0 percent to 30.6 percent. For the IG, the percentage did not change from the BY through PY2.

## **2.4 Cost and Savings**

### **2.4.1 Savings Calculated for MHCQ Demonstration Performance Payments**

To determine whether the NC-CCN MHCQ demonstration achieved Medicare savings, CMS contracted with an implementation contractor (independent of the RTI evaluation contract) to calculate savings according to the terms and conditions in the demonstration protocol. The NC-CCN PY1 and PY2 financial reconciliation reports both found that NC-CCN's Medicare savings did not exceed the minimum savings requirement, so NC-CCN did not earn a performance payment from Medicare for PY1 or PY2 (Coomer et al., 2011; 2013).

### **2.4.2 Impact of the NC-CCN MHCQ Demonstration on Cost Outcomes**

NC-CCN had originally planned to expand the MHCQ demonstration in PY3 to include Medicare-only beneficiaries. However, NC-CCN staff indicated to the evaluation team that they did not expand the demonstration to Medicare-only beneficiaries because the financial reconciliation results did not show cost savings for PY1 or PY2. NC-CCN thus continued to focus its MHCQ demonstration efforts on dually eligible beneficiaries through PY3.

A NC-CCN staff member voiced concerns to the evaluation team that the program's care management interventions to improve quality metrics may not translate to Medicare cost savings in the immediate future, but they could lead to significant savings "in a few years." NC-CCN staff reported that costs initially increased for dually eligible, non-dual ABD, and Medicaid patients because they "were being brought under management and getting care they hadn't been getting previously." They anticipated that it required "6 months plus to see the curve turn" and show savings. One provider observed that certain dual eligible patients would never respond to interventions: "There are some patients that have gone to the point of 'non-impactable'—and I won't say that is a failure of the system, but the situation is so complex, that no matter what you do for those patients, you can't change them. For example, patients with a huge dysfunctional family... [where] there are addictions, criminal issues around the patient."

NC-CCN and network staff reported to the evaluation team that transitional care interventions to reduce hospital admissions and readmissions were the activities that they would focus on for reducing costs and showing savings. Leadership of one network reported that they were achieving most savings through pharmacy activities and enrollment efforts, as they "save a certain amount of money by simply enrolling patients and instituting routine programs to people who have been out of the system." However, the network's medical director observed that this "low-hanging fruit" of enrolling patients and adhering to prescription drug formularies has been nearly exhausted and that the next steps for savings will be "hard work." In particular, he noted that improving late life care for patients' last 3–6 months of life and documenting patient preferences could become important.

One network reported to the evaluation team that it was addressing costs by working with practices to assess patient needs before signing an order for services or equipment to be covered. They would send a care manager into the home to determine if a patient already had the requested resource, if the patient had functional needs that affected two or three activities of daily living, or both, before the patient's doctor signed for medical necessity. Network staff observed that doctors had been getting stacks of such orders and signing them without knowing if there was a medical necessity. In addition to incurring unnecessary medical costs, the network explained that these resources might make an elderly person more dependent when the patient may simply need a tool (such as a grab bar in the shower) or a short period of physical therapy to help maintain independence. The network aimed to engage care managers in pursuing less costly routes to improve patient quality of life.

One physician asserted in comments to the evaluation team that provider coding was a barrier to achieving savings in PY1 because patients were more severely ill than demonstrated through coding: "We would code a diabetic patient with eye disease, kidney disease, and neuropathy. We would just code a 250.00, for diabetes without mention of complications." The physician believed that MHCQ providers had been coding more completely since PY1, but that better coding from the beginning of the demonstration could have allowed MHCQ practices to demonstrate savings.

The results of the multivariate analysis of the impact of the NC-CCN MHCQ demonstration intervention on an overall cost outcome measure are shown in **Table 7**. This table presents the impact of the NC-CCN demonstration on annualized Medicare expenditures per beneficiary. These multivariate regression analyses are conducted on beneficiaries weighted by propensity scores to balance the IG and CG populations. They also control for other variables not shown in **Table 7**, including HCC risk score, age, gender, Medicaid eligibility status, Medicare eligibility status, and race. Additional details of the multivariate analysis methodology are available in the MHCQ Demonstration Evaluation Design Report (Trisolini et al., 2013).

**Table 7** presents demonstration impact results for the main NC-CCN MHCQ demonstration intervention effect, for a sensitivity test using an alternate beneficiary assignment rule (plurality of primary care visits compared with a one-touch rule in the main demonstration analysis), and for a second sensitivity test including only those beneficiaries for the IG who were both assigned to NC-CCN for the MHCQ demonstration and also enrolled in the CCNC Medicaid medical home program.

**Table 7** shows that for the main NC-CCN MHCQ demonstration effect, per-capita costs for the IG decreased from the BY through PY2 compared with the CG during the same time period, but the effect was not statistically significant at the 5 percent level. It was close, with statistical significance at the 5.6 percent level, but it did not achieve the usual standard of statistical significance at the 5 percent level. In contrast, the basic descriptive statistics in **Table 6** show per capita costs rising for both the IG and CG over time. The multivariate analysis results in **Table 7** evaluate whether the IG cost growth rate was slower than the CG cost growth rate, while also controlling statistically for the range of other factors described above that may affect costs.



To test whether Medicare savings would have occurred if beneficiaries were assigned on the basis of a plurality of touches with an NC-CCN practice, as opposed to the one-touch rule used for beneficiary assignment for NC-CCN in the MHCQ demonstration, a sensitivity analysis was done with the reassigned beneficiaries. A plurality assignment methodology similar to the methodologies used in the CMS Physician Group Practice Demonstration and in the Medicare Shared Savings Program Accountable Care Organization program was used with the NC-CCN MHCQ demonstration beneficiaries. **Table 7** shows that this sensitivity analysis found that per-capita costs for the IG decreased from the BY through PY2 compared with the CG during the same time period, but the effect was not statistically significant at the 5 percent level.

**Table 7**  
**Financial outcomes: Multivariate regression analysis results for per-capita expenditures**

Variable	Main NC-CCN MHCQ demonstration results	Plurality assignment rule sensitivity test	Both MHCQ demonstration assignment and CCNC enrollment sensitivity test
N	438,393	386,812	334,273
R <sup>2</sup>	0.6519	0.6535	0.6553
Demonstration effect coefficient <sup>1</sup>	-\$169	-\$183	-\$654
Coefficient standard error <sup>2</sup>	\$88	\$105	\$168
Coefficient statistical significance <sup>2</sup>	0.056	0.082	0.000***

NOTES:

CCNC = Community Care of North Carolina; MHCQ = Medicare Health Care Quality; NC-CCN = North Carolina Community Care Networks.

The dependent variable is Medicare annualized expenditures. The regression is estimated on base year (BY) to performance year 2 (PY2) data (October 2008–September 2011) for assigned and comparison group beneficiaries. The BY dummies are omitted to avoid collinearity. Regression is weighted by Medicare eligibility fraction and by beneficiary propensity scores.

1. Negative coefficients indicate cost savings, and positive coefficients indicate cost increases, on a per-person-per-year basis.
2. Statistical significance levels and coefficient standard errors are adjusted for beneficiary-level clustering.  
\*\*\*Statistically significant at the < 0.1% level

SOURCE: RTI International analysis of Medicare claims October 2008–September 2011.

**Table 7** also shows the results of the second sensitivity test, evaluating the alternate definition for the IG that included only beneficiaries who were both assigned to NC-CCN for the MHCQ demonstration and also enrolled in CCNC’s Medicaid medical home program. **Table 7** shows that this sensitivity analysis found that per-capita costs for the IG decreased by \$654 from the BY through PY2 compared with the CG during the same time period, and the effect was statistically significant at the 0.1 percent level. This represents a favorable effect of the MHCQ demonstration for this subset of the assigned beneficiaries who were also enrolled in CCNC’s Medicaid program. The size of the effect is notable, at \$654 per beneficiary per year, and the level of statistical significance is also notable, at the 0.1 percent level. As described above, enrollment in CCNC is voluntary for dually eligible beneficiaries, so these results are for a

subgroup of the main demonstration IG. IG beneficiaries also enrolled in CCNC totaled 10,101 in the BY and 27,657 in PY2. Propensity score analysis was conducted independently for this multivariate statistical analysis sensitivity test to balance this IG subgroup with the CG.

**Table 8** presents results for the multivariate regression analyses for the impact of the NC-CCN demonstration on cost by beneficiary subgroups. The statistical methods are the same as in **Table 7** for the main NC-CCN MHCQ demonstration results. **Table 8** shows that, when the impact of the demonstration on per-capita costs was analyzed by beneficiary subpopulations, only a few significant effects were found. Of the 13 subgroups analyzed, statistically significant intervention effects were found for 3 subgroups, including vascular disease, end-stage renal disease (ESRD), and beneficiaries eligible for Medicare due to disability. For each of these subgroups the costs declined for the IG compared with the CG, which are favorable effects of the NC-CCN MHCQ demonstration.

**Table 8**  
**Cost outcomes: Multivariate regression analysis results for analyses of subgroups of the main NC-CCN demonstration population for per-capita expenditures**

Subgroup <sup>1,2</sup>	Demonstration effect coefficient
1. Cancer subgroup	-\$633
2. Congestive heart failure subgroup	-\$367
3. Diabetes subgroup	-\$328
4. Chronic obstructive pulmonary disease subgroup	\$37
5. Acute myocardial infarction subgroup	-\$1,094
6. Stroke subgroup	-\$338
7. Vascular disease subgroup	-\$656*
8. Any of 7 diseases subgroup	-\$229
9. End-stage renal disease subgroup	-\$4,056**
10. Disabled subgroup	-\$265*
11. Inpatient > \$0 subgroup	-\$495
12. Upper 10% of risk scores subgroup	-\$1,304
13. Upper 25% of risk scores subgroup	-\$760

**NOTES:**

The dependent variable is Medicare annualized expenditures. The regression is estimated on Base Year (BY) to Performance Year 2 (PY2) data (October 2008–September 2011) for assigned and comparison group beneficiaries. Regression is weighted by Medicare eligibility fraction and propensity scores.

1. Negative coefficients indicate cost savings, and positive coefficients indicate cost increases, on a per-person-per-year basis.
2. Statistical significance levels and coefficient standard errors are adjusted for beneficiary-level clustering. \*Statistically significant at the < 5% level. \*\*Statistically significant at the < 1% level.

SOURCE: RTI International analysis of Medicare claims October 2008–September 2011.

The size of the ESRD subgroup effect is notable, at \$4,056 per beneficiary, and its level of statistical significance is also notable, at the 1 percent level. Higher levels of savings may be

possible for ESRD beneficiaries since they have much higher average costs than the average costs for dually eligible beneficiaries overall.

**Table 9** presents multivariate statistical analysis results for the impact of the NC-CCN demonstration intervention on costs by types of Medicare service and their associated Medicare claims data expenditure components. The statistical methods are the same as for the Main NC-CCN MHCQ demonstration results shown in **Table 7**. Of the 10 types of expenditure components analyzed, statistically significant intervention effects were found for 2 components, Outpatient Institutional and Part B Physician/Supplier. For the Outpatient Institutional component, the per-capita costs increased for the IG compared with the CG, which represents an unfavorable effect of the NC-CCN MHCQ demonstration. For the Part B Physician/Supplier component, the per-capita costs declined for the IG compared with the CG, which represents a favorable effect of the NC-CCN MHCQ demonstration. This effect would not necessarily be predicted for the NC-CCN intervention which focused on increasing care management services.

**Table 9**  
**Financial outcomes: Multivariate regression analysis results for expenditure components for per-capita expenditures**

Expenditure component <sup>1,2</sup>	Regression coefficient for demonstration effect
Total	-\$169
Inpatient total	-\$144
Inpatient	-\$87
Inpatient skilled nursing facility	-\$57
Outpatient total	-\$17
Outpatient institutional	\$75**
Outpatient Part B physician/supplier	-\$113***
Outpatient home health	\$23
Outpatient durable medical equipment	-\$10
Hospice	\$8

NOTES:

The dependent variable is Medicare annualized expenditures. The regression is estimated on Base Year (BY) to Performance Year 2 (PY2) data (October 2008–September 2011) for assigned and comparison group beneficiaries. The regression is weighted by Medicare eligibility fraction and propensity scores.

1. Negative coefficients indicate cost savings, and positive coefficients indicate cost increases, on a per-person-per-year basis.
2. Statistical significance levels and coefficient standard errors are adjusted for beneficiary-level clustering. \*\*Statistically significant at the < 1% level. \*\*\*Statistically significant at the < 0.1% level.

SOURCE: RTI International analysis of Medicare claims October 2008–September 2011.

## 2.5 Quality

### 2.5.1 Quality Measures Reported by NC-CCN for the MHCQ Demonstration

NC-CCN staff reported that they implemented 7 new quality measures for the MHCQ demonstration in PY2 in addition to the 18 quality measures from PY1. NC-CCN reported that they had worked with network leadership throughout the demonstration to propose measures and seek the networks' approval. NC-CCN indicated that in PY2 they continued to contract with Area Health Education Centers to carry out the chart reviews for quality metrics and give feedback reports to networks and practices on 5–6 measures. One physician suggested to the evaluation team that NC-CCN should have proposed more “patient-centered” measures, rather than purely biological measures, to gauge quality of care.

**Table 10** presents NC-CCN's quality performance for the quality measures that it developed and reported for the MHCQ demonstration. NC-CCN reported meeting targets for 23 of the 25 PY2 quality measures. The targets used for the MHCQ demonstration were developed from nationally recognized standards where available, including the National Committee for Quality Assurance (NCQA) Diabetes Recognition Program Performance Goals and the NCQA Heart Stroke Recognition Program. No nationally recognized standard was available for 4 of the 25 measures. For those measures, the target was set at a flat rate of 90 percent for claims-based measures (A1c testing, Left ventricular function assessment) or at 90 percent of a 2010 baseline rate (for Medication reconciliation, Hospital discharges with transitional care).

**Table 10**  
**NC-CCN MHCQ demonstration quality measures, PY2 targets, and quality performance in PY2 relative to targets**

Quality measure	PY2 target	PY2 performance results	Met target? (yes/no)
Diabetes care: A1c testing	91%	89.8%	No
Diabetes care: Lipid Profile	80	77.7	No
Diabetes care: Retinal or dilated eye exam	59	59.4	Yes
Diabetes care: Foot exam	72	82.5	Yes
Diabetes care: Smoking status	72	89.3	Yes
Diabetes care: A1c < 8.0	53	63.4	Yes
Diabetes care: Nephropathy screening or treatment	78	87.4	Yes
Diabetes and Hypertension care: ACE/ARB therapy	72	77.5	Yes
CHF: LVF Assessment	90	92.9	Yes
CHF: ACE/ARB Therapy	72	79.4	Yes
CHF: Beta Blocker Therapy	72	90.3	Yes
CHF: Smoking Status	72	90.3	Yes
CHF: BP Control	61	71.5	Yes
CHF: Weight measurement in most recent medical visit	72	74.8	Yes
IVD: Lipid Measurement	72	72.1	Yes

(continued)

**Table 10 (continued)**  
**NC-CCN MHCQ demonstration quality measures, PY2 targets, and quality performance in PY2 relative to targets**

Quality measure	PY2 target	PY2 performance results	Met target? (yes/no)
IVD: BP Control	61	68.5	Yes
IVD: Aspirin Use	72	77.5	Yes
IVD: Smoking Status	72	88.5	Yes
Hypertension: BP Control	61	66.3	Yes
Hypertension: Smoking Status	72	86.1	Yes
Transitional Care: Readmission Percentage Rate	21	20.4	Yes*
Transitional Care: Patients hospitalized for CHF with an outpatient visit within 30 days of discharge	89	89.1	Yes
Patient Safety: Medication reconciliation performed after hospital discharge	13	21.6	Yes
Patient Safety: Hospital discharges with transitional care management and support	33	43.8	Yes
COPD: Smoking status and cessation advice	72	89.1	Yes

NOTE: ACE = angiotensin-converting-enzyme; ARB = angiotensin II receptor blocker; BP = blood pressure; CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease; IVD = in vitro diagnostic; LVF = left ventricular function; MHCQ = Medicare Health Care Quality; NC-CCN = North Carolina Community Care Networks.

\*Lower numbers represent better performance.

SOURCE: NC-CCN.

NC-CCN staff reported to the evaluation team that they had difficulties with the diabetes foot exam measure because there were no baseline data. They hoped to use EHR data in the future to establish a baseline, as it would be much easier than chart review for data collection. NC-CCN staff reported that they had also pushed for more preventive cancer screenings and depression screenings with networks since the start of the MHCQ demonstration, as both screenings were pertinent to the dually eligible population.

### **2.5.2 Quality Improvement Efforts Reported for the NC-CCN MHCQ Demonstration**

One physician reported to the evaluation team that his practice was developing protocols for all of its providers to implement in care delivery as part of their MHCQ demonstration participation and overall collaboration with CCNC. The physician emphasized that the protocols allowed for nurses to work to the top of their license, increased efficient use of physicians' time, encouraged a team approach to care, and created the conditions for physicians to be held accountable for following an algorithm for treatment rather than a patient's outcome.

Medication reconciliation continued to be a crucial activity in management of the dually eligible population. Care managers reported to the evaluation team that on home visits they almost always found medication-related issues. For example, patients may take a family

member's medication, forget dosages, or limit their dosages because the copay is too expensive. One network reported that medication reconciliation happened within days of discharge for their patients as of early 2012, which was a dramatic improvement since the beginning of the MHCQ demonstration.

Care managers often identified opportunities for interventions during home visits. NC-CCN staff recalled in comments to the evaluation team that one care manager had visited the home of a high-utilizer asthmatic patient and found the patient had no air conditioning. The care manager found local resources to get air conditioning installed for the patient, whose ED visits significantly dropped. Care managers also monitored patient homes for safety issues, such as fall risks. One network reported to the evaluation team that they gave an extensive training to the care managers and social workers on home safety evaluations: "They all learned what things to look at when you go into the home. Are there throw rugs that need to be moved? Is there a phone located where this patient could reach it?" One care manager who attended the training later developed her own falls assessment for home visits and implemented it with her assigned practice. The network reported that they received positive feedback from the practice on the assessment's use for educating both patients and providers about safety needs and preventing falls in homes.

After enhanced palliative care efforts began in 2009 with ABD funding from Medicaid, CCNC providers reported to the evaluation team that they found positive effects of advance care planning services for the dually eligible population as networks expanded their outreach efforts. One provider noted that physicians at her practice had noticed increased documentation of advance care directives by care managers in their EHR during the MHCQ demonstration period. NC-CCN staff also reported seeing an overall higher rate of referral to hospice due to palliative care efforts.

### **2.5.3 Multivariate Statistical Analysis of NC-CCN Quality Performance**

**Table 11** presents the results of the multivariate statistical analysis of the impact of the NC-CCN demonstration on five Medicare claims-based quality measures. These claims-based measures enable the analysis to assess NC-CCN's quality performance in relation to the CG, since quality measure performance results can also be calculated for the CG using Medicare claims data.

These multivariate regression analyses use a logistic regression model because they have dependent variables that are binary (either 1 or 0 representing whether or not the beneficiary got the care indicated by the quality measure). These logistic regression analyses include control variables for HCC risk scores, age, gender, Medicaid status, Medicare eligibility status, and race. Further details on the statistical methods are included in the MHCQ Demonstration Evaluation Design Report (Trisolini et al., 2013).

The results in **Table 11** show that demonstration effects were statistically significant for one quality measure, lipid profile testing once per year for beneficiaries with coronary artery disease (CAD). The positive coefficient (greater than zero) indicates that there was a higher probability of receiving the indicated care for the lipid profile testing measure in the IG than in the CG, which is a favorable impact of the NC-CCN demonstration on quality of care for this measure. However, the results for the other four quality measures shown in **Table 11** were not

statistically significant, indicating no impact of the NC-CCN demonstration on quality of care for those measures.

**Table 11**  
**Demonstration impact on quality outcomes—multivariate regression results for five claims-based quality measures for the main NC-CCN demonstration population**

Claims-based quality indicator	Demonstration effect coefficient <sup>1,2,3</sup>
Glycated hemoglobin testing once per year for diabetics	0.03
Low-density lipoprotein testing once per year for diabetics	0.04
Testing or treatment for nephropathy for diabetics	-0.05
Lipid profile testing once per year for beneficiaries with coronary artery disease	0.08*
Left ventricular ejection fraction testing if hospitalized for heart failure	-0.10

NOTES:

The regression is estimated on Panel 1 base year (BY) to Performance Year 2 (PY2) data (July 2008–June 2011) for intervention group (IG) and comparison group (CG) beneficiaries.

1. The dependent variable for each logistic regression analysis is a binary indicator for achieving a quality measure. Coefficients > 0 indicate higher quality of care, and coefficients < 0 indicate lower quality of care.
  2. The regression analyses are weighted by Medicare eligibility fraction and by beneficiary propensity scores.
  3. Statistical significance levels and coefficient standard errors are adjusted for beneficiary-level clustering.
- \*Statistically significant at the < 5% level.

SOURCE: RTI International analysis of Medicare claims and enrollment data for July 2008–June 2011.

Measures assessing utilization indicators are included in the next section. Some of these, such as readmissions, are sometimes also viewed as quality measures since they reflect the impact of quality of care on utilization.

## 2.6 Utilization

NC-CCN staff reported to the evaluation team that they had not yet conducted internal analysis on changes in utilization of health care services for the MHCQ demonstration beneficiaries. However, they noted that networks and practices focused some program interventions on patients with high utilization rates. For example, in November 2011, NC-CCN pilot tested a call center in two networks as part of efforts to reduce nonemergent ED utilization among CCNC-enrolled patients. Four staff members were hired for the call center, including one registered nurse supervisor and three health educators. The project was expanded to include CCNC-enrolled patients from all 14 CCNC networks in February 2012. Using admitting-discharge-transfer (ADT) system feeds from hospitals that had agreed to share data with NC-CCN, staff called enrolled patients who had recently had nonemergent visits to the ED to educate them about their medical home and asked the following questions:

- Did you know you have a medical home?
- Did you know your doctor has after-hours medical service?

- What led you to go to the ED instead of calling your doctor's office?
- [If they did call their doctor:] What did your doctor tell you to do?
- What were you told at the ED?
- Did you get any additional prescriptions? Did you fill them?
- Do you need anything else?

The call center emphasized the importance of the medical home and was able to send a secure message to the patient's care manager about any needs identified during the call. Call center statistics were reviewed monthly by NC-CCN and data were made available to networks so that, for example, they could see all patients that called their doctor and got no answer to follow up with particular practices about after-hours access. NC-CCN staff reported a 45 percent decrease in the per-member-per-month ED admission rate, a 37 percent decrease in nonemergent ED visits, and a 33 percent cost reduction among patients who were contacted through the call center across the 14 networks.

To tackle avoidable readmissions during PY2 and PY3, one network reported to the evaluation team that it began collaborating with the Carolinas Center for Medical Excellence and other local organizations. They performed a root cause analysis for a large regional hospital serving two MHCQ counties to formulate a community plan for addressing drivers of readmission. The network recently expanded their efforts to prevent readmissions in non-MHCQ counties.

Furthermore, all MHCQ networks interviewed by the evaluation team in 2012 reported that they were working to reduce MHCQ demonstration beneficiary hospital admissions from long-term care facilities by reaching out to local facilities. With additional funding from a NC-CCN grant, one network engaged a large PCP practice that previously was not a CCNC practice for the MHCQ demonstration because they worked only in long-term care facilities, such as SNFs or assisted living facilities. The network and practice were focusing on transitions and advance care planning with MHCQ patients in up to 12 facilities within the network's geographic region. Both care managers and clinical pharmacists from the network provided on-site services to patients who were residents in the facilities. The network and practice also initiated quarterly long-term care community meetings that included representatives from the major local hospital and aging organizations to identify and solve transitions of care problems.

Another network reported to the evaluation team that they had started an initiative with willing physicians from a subset of practices to provide monthly on-site medical visits in local long-term care facilities. The initiative began as part of the MHCQ demonstration and served a large number of the network's dually eligible patients. CCNC care managers assigned to the facilities followed up with site administrators and residents every 2 weeks or as needed. The initiative focused on keeping residents out of the ED and inpatient hospital setting. Those who had been admitted were followed up within 72 hours of returning to their long-term care facility.

A third network reported to the evaluation team that they dedicated two social workers to coordinating transitions for patients admitted to the hospital with a primary diagnosis of



behavioral health. They followed up after 30 days and to check that the patients were connected to a PCP and had not had a readmission.

**Table 12** presents multivariate regression analysis results for utilization outcomes for the NC-CCN MHCQ demonstration, including measures for hospital admissions, ED visits, and 30-day readmissions. These results show that the demonstration effects were statistically significant for ED visits for both the predicted number of utilization events and for the overall demonstration effect on utilization. These two effects were both negative, which means the demonstration reduced ED visits, so they represent favorable impacts of the demonstration on this utilization outcome. The percentage changes included in **Table 12** are associated with the effect coefficients, and they translate those coefficients from nonlinear statistical models into estimated percentage effect sizes. For example, the estimated effect size for the overall reduction in ED visits is  $-2.34$  percent.

**Table 12** also shows that there were no statistically significant reductions in utilization for hospital admissions or for 30-day readmissions. In sum, the NC-CCN MHCQ demonstration had a favorable effect on only one of these three utilization measures.

**Table 12**  
**Utilization outcomes: Summary of statistical analysis results for hospital admissions, emergency department visits, and 30-day readmissions**

Measure	Hospital admissions	Emergency department visits	30-day readmissions
Predicted probability of a utilization event occurring <sup>1</sup>	0.0011	-0.0041	0.0003
Predicted number of utilization events <sup>2</sup>	-0.0013	-0.0439*	0.0191
Overall demonstration effect on utilization <sup>3</sup>	0.0009	-0.0383*	0.0064
Percent change in predicted probability of utilization event occurring	0.36%	-0.78%	0.15%
Percent change in predicted number of utilization events	-0.08%	-1.64%*	1.30%
Percent change from overall demonstration effect on utilization	0.15%	-2.34%*	1.87%

NOTES: \*Statistically significant at the  $< 5\%$  level.

1. Logit regression models were used to calculate the predicted probability of utilization binary events (yes/no event) occurring, such as whether or not a beneficiary had at least one hospital admission per year.
2. Negative binomial regression models were used to predict the number of times a utilization event occurs. These models, which were estimated on beneficiaries who had at least one occurrence of the utilization event (such as beneficiaries with at least one hospital admission), predict the number of admissions among beneficiaries who had at least one admission.
3. Combined hurdle regression models were used to analyze the joint effects of two separate processes generating the utilization outcomes. These include one process generating whether or not a beneficiary experienced an event, and another process that generates the number of events the beneficiary experienced given that the beneficiary had at least one event. The combined hurdle models combine the information from the logit models and the negative binomial models to calculate the overall effect of the demonstration on the utilization outcomes.

SOURCE: RTI International analysis of Medicare claims October 2008–September 2011.

*[This page intentionally left blank.]*

### SECTION 3

#### LESSONS LEARNED AND IMPLICATIONS FOR FUTURE PROGRAMS

A variety of lessons learned and implications for future programs can be gleaned from the results of the NC-CCN MHCQ demonstration in its first two performance years that are the focus of this report.

The quantitative analyses of the NC-CCN demonstration were all conducted in comparison to performance by the CG on the same outcomes. The cost impacts of the demonstration were mixed, with no overall statistically significant cost savings shown for the main NC-CCN MHCQ demonstration, but a sizable and statistically significant cost savings was found for overall expenditures in the sensitivity analysis for beneficiaries who were both assigned to the NC-CCN IG in the MHCQ demonstration and also enrolled in CCNC's Medicaid medical home program.

In addition, statistically significant cost savings were found for 3 of 14 subgroup analyses, including beneficiaries with vascular disease, beneficiaries with ESRD, and disabled beneficiaries. Statistically significant savings was found for one of 10 expenditure component analyses, for the Part B physician/supplier component. However, there was also one expenditure component, the outpatient institutional component, that had significant cost increases, compared to the CG.

The multivariate statistical analysis of quality impacts of the NC-CCN demonstration, in comparison to the CG quality performance, found a statistically significant and favorable impact for only one of the five claims-based quality measures, lipid profile testing for beneficiaries with CAD once per year. No significant impacts were found for the other 4 claims-based quality measures.

In contrast, NC-CCN's self-reported quality measures for the MHCQ demonstration, that were assessed against targets agreed upon with CMS and not against a CG, showed good results with the targets met for 23 of the 25 quality measures. Most of the targets were set using national benchmarks for those quality measures, but these results do not indicate whether or not the same results were achieved by the CG in the absence of the MHCQ demonstration incentives.

The multivariate analysis of utilization impacts of the NC-CCN MHCQ demonstration, in comparison to the CG quality performance, found statistically significant lower utilization for one of the three utilization measures. This significant impact was for ED visits, although the magnitude of this reduction in utilization was not sufficient to result in overall cost savings for the NC-CCN demonstration, as noted.

In sum, several lessons were learned from the multivariate statistical analysis of NC-CCN MHCQ demonstration impacts on cost, quality, and utilization. The key points are as follows:

- The overall cost impact of the NC-CCN demonstration over the first two performance years was not statistically significant at the 5 percent level. It was close, with statistical significance at the 5.6 percent level, but it did not achieve the usual standard of statistical significance at the 5 percent level. One of two sensitivity

analyses showed a statistically significant effect, although this was for a subgroup of beneficiaries assigned to NC-CCN and also enrolled in the CCNC Medicaid medical home program, so that was not the main intervention group for this MHCQ demonstration. Future demonstrations should test programs with this alternate type of intervention group definition further, to better assess its potential for reducing costs and improving quality. It may be that this type of more intensive intervention provided to this subgroup is needed to achieve significant impacts on cost and quality outcomes.

- The quality impact analysis results showed improved quality on only one of five quality measures that were assessed against a CG. NC-CCN did meet quality targets for 23 of its 25 self-reported quality measures, but these quality measures were not assessed in the CG, so it is unclear if these targets would have been met in the absence of the demonstration. Future Medicare demonstration projects should emphasize quality evaluation against CGs and not only against targets assessed only for the IG and that may also be achieved in the absence of the demonstration interventions.
- The utilization results showed a statistically significant and favorable effect for one of three utilization measures, which was not sufficient to affect overall cost impact performance for the NC-CCN MHCQ demonstration.

Qualitative analysis and descriptive statistics also provide a number of lessons learned and implications for future programs. Increased provider participation would have been beneficial to the MHCQ demonstration, as providers interviewed by the evaluation team in 2012–2013 generally demonstrated a lack of awareness about the demonstration unless they had leadership roles in CCNC networks or in NC-CCN. Providers rarely attributed specific care delivery activities to the MHCQ demonstration. Most physicians did not distinguish MHCQ demonstration activities from the overall services provided to them through CCNC network affiliation. One physician noted that CCNC and its networks needed to buy some of the physicians' time to establish physician champions in communities and increase awareness and engagement throughout the state at the physician level. Most practices considered the MHCQ demonstration to be one of multiple synergetic activities and sources of funding affecting their patient populations. One provider from a large health system emphasized that other major interventions affecting MHCQ demonstration patients in the system's practice were being implemented by the health system outside of the practice's work with NC-CCN.

Many network staff and providers indicated to the evaluation team that they anticipated savings in later years of the MHCQ demonstration, but few expected early savings to be shown in the cost impact analysis. Generally, interviewees agreed that the dually eligible population was particularly complex and resource intensive. One physician reiterated the complexity of dually eligible patients as a significant barrier to showing early savings: "It takes years to see something change with this patient population, so I did not expect a miracle. We have isolated incidences of great success, but that is not to be counted as overall success."

NC-CCN seemed to be recycling its CCNC interventions with few additional resources devoted to dually eligible beneficiaries due to limited funding or to hopes that they could

demonstrate savings under the MHCQ demonstration without much additional effort. Staff of one network explained that they were relying on Medicaid payments to fund their care managers, who were “stretched thin” in having expanded their services to include dually eligible beneficiaries in the MHCQ demonstration without additional funding to support the expansion in services. Site visit participants agreed that more investments in resources and infrastructure were needed at the beginning of the MHCQ demonstration. Future Medicare demonstration projects involving dually eligible beneficiaries should consider up front incentive payments for defined care delivery interventions as a way to ensure that provider involvement and intervention efforts are enhanced significantly enough to provide a good test of the efficacy of the interventions for reducing costs and improving quality.

NC-CCN site-reported data included information on beneficiaries who received one or more types of NC-CCN non-Medicare and non-Medicaid services, but those data were found to be incomplete and recorded in inconsistent ways by different staff, and thus not useful for evaluation purposes. NC-CCN staff indicated that those data were intended for internal operations purposes by care managers, and had not been intended for use in evaluation analysis. Future Medicare demonstration projects should consider ways to ensure that site reported data collected on non-Medicare services that are not recorded in Medicare claims data are collected in a more systematic and comprehensive way so that they can be used for both internal operations purposes by demonstration site staff and also for evaluation purposes by CMS.

NC-CCN staff identified a number of challenges in implementing the MHCQ demonstration that should also be considered in designing future CMS programs. They viewed data delays and attribution issues as barriers to demonstrating cost savings in the MHCQ demonstration. The MHCQ one-touch attribution logic was cited by NC-CCN as a barrier to achieving savings, as it did not identify longitudinal patient-provider relationships and created significant turnover in the attributed beneficiary population from year to year. NC-CCN informatics staff reported that having technical assistance from CMS to understand and work with Medicare data would have helped to resolve some of the data issues early on. They also considered not getting Part D data to be a “big problem” for the MHCQ demonstration because medication fill history information “adds a lot of value in managing patients.”

*[This page intentionally left blank.]*

## REFERENCES

Coomer, N., Adamache, W., Patterson, L., et al.: North Carolina Community Care Networks: Health Care Quality 646 Demonstration Performance Year One Financial Results. Research Triangle Park, N.C. RTI International, 2011.

Coomer, N., Patterson, L., Smith K., et al.: North Carolina Community Care Networks: Health Care Quality 646 Demonstration Performance Year Two Financial Results. Research Triangle Park, N.C. RTI International, 2013.

MEDPAC. (2012). A Data Book: Health Care Spending and the Medicare Program. Washington, D.C. Medicare Payment Advisory Commission.

Sorensen, A., Bernard, S., Tant, E., et al.: Medicare Health Care Quality Demonstration: North Carolina Community Care Network Case Study Report. Prepared for the Centers for Medicare & Medicaid Services. Research Triangle Park, N.C. RTI International, 2010.

Trisolini, M., Kautter, J., Sorensen, A., et al.: Medicare Health Care Quality Demonstration Evaluation: Evaluation Design Report Year 2. Prepared for the Centers for Medicare & Medicaid Services. Research Triangle Park, N.C. RTI International, 2013.