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Evaluation of the Initiative to Reduce Avoidable Hospitalizations among Nursing Facility Residents

Summary of Evaluation as of December 2014

Prepared for

Jean Scott, DrPH, RN

Center for Medicare and Medicaid Innovation

Centers for Medicare & Medicaid Services

Mail Stop WB-06-05

7500 Security Boulevard

Baltimore, MD 21244-1850

Prepared by

Melvin J. Ingber, PhD

Zhanlian Feng, PhD

Galina Khatutsky, MS

Nan Tracy Zheng, PhD

Alison Vadnais, MHS

Catherine Ormond, MS

William Bayliss, BA

Nathaniel Breg, BA

RTI International

1440 Main Street, Suite 310

Waltham, MA 02451-1623

RTI Project Number 0212790.006



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EVALUATION OF THE INITIATIVE TO REDUCE AVOIDABLE HOSPITALIZATIONS
AMONG NURSING FACILITY RESIDENTS:
SUMMARY OF EVALUATION AS OF DECEMBER 2014

Government Task Lead: Jean Scott, DrPH, RN

RTI International

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OVERVIEW OF SUMMARY

This summary presents findings from the Evaluation of the Initiative to Reduce Avoidable Hospitalizations among Nursing Home Residents. The evaluation uses a combination of quantitative and qualitative methods to evaluate the seven Enhanced Care and Coordination Provider (ECCP) interventions, customizing the overarching evaluation design to (1) capture each ECCP's unique features and (2) develop an in-depth understanding of the transformative processes that may occur throughout the Initiative's implementation. This approach allows us to directly link structural and process changes to outcomes. Outcomes of interest include measures of utilization, spending, and quality of care. The findings described are derived from data for the ECCP facilities and a comparison group of facilities chosen from within each state in which the ECCP implements the Initiative. The comparison group selection is described in Section 2 and Appendix B,

This summary report presents results of the quantitative analysis of data from the first Initiative year, 2013. At the time of this report, the Centers for Medicare & Medicaid Services (CMS) Minimum Data Set (MDS) and Medicare claims data for 2014 were not complete, so the second Initiative year could not yet be analyzed quantitatively. However, as part of the evaluation we also track the raw statistics for each calendar quarter through ongoing quarterly reports to determine if any sentinel changes are occurring. No sentinel changes have been observed in the quarterly report statistics through 2014. Medicaid claims data are not included in these analyses because they are not available at this time.

The overall picture is that of a transition period in 2013 and continuing into 2014. The quantitative results, therefore, do not show definitive effects of the Initiative at this stage. Findings from the Web-based survey of Nursing Home Administrators in participating facilities collected in August/September 2014 confirmed that none of the ECCPs had fully implemented the components of the Initiative at that time.

First, we present some descriptive statistics of the patterns of utilization, spending, and quality for context. Appendix D has more detail:

- Approximately 30 percent of all residents experienced at least one hospitalization and roughly 15 percent experienced at least one potentially avoidable hospitalization in each year. This is true for both the intervention and comparison groups. This suggests that among those residents who were hospitalized in a given year, approximately half of them had at least one hospitalization that was potentially avoidable.
- Among those who ever visited the emergency department (ED) in a given year (without inpatient admission), approximately one-third of them did so for a potentially avoidable reason. This is true for both the intervention and comparison groups.
- Average Medicare expenditures for ECCP facility residents generally are similar to those in the comparison group within each state; however, more variation is seen in spending among the states. Inter-state variation also is seen in Medicare expenditures for hospitalizations and potentially avoidable hospitalizations.

- We report descriptive statistics for 16 quality outcomes for the ECCP and comparison groups in each state. The ECCP group in each state showed better quality compared to the comparison group for some outcomes and poorer quality for others. The results also showed variations in quality across states. We observed greater variation in quality across states than between the ECCP and comparison groups within states.

The following bullets are summary findings for the ECCP interventions from multivariate statistical analysis focused on estimating the effects of the Initiative. The fuller presentation in Section 4 explains in more detail why these numbers should not be taken as resulting causally from the specific interventions of the Initiative.

- The estimated Initiative effect for the odds of a hospitalization (all-causes) is determined by comparing the *change* in the odds of such a hospitalization in the ECCP facilities over the period from the pre-Initiative year of 2011 to that in 2013, to the similar *change* for a set of comparison facilities: Five of the seven ECCPs showed some degree of improvement. For three of the ECCP groups the effect estimated could be considered statistically significant but given the transitional status of the intervention in 2013 the causal link would not be definitive.
- The estimated Initiative effect for the odds of a potentially avoidable hospitalization is determined by comparing the *change* in the odds of such a hospitalization in the ECCP facilities over the period from the pre-Initiative year of 2011 to that in 2013, to the similar *change* for a set of comparison facilities: Six of the seven ECCPs showed some degree of improvement. For two of the ECCP groups, the effect estimated could be considered statistically significant but causal links to the Initiative are not clear given the transitional status of the Initiative.
- Only one ECCP showed a statistically significant effect for both hospitalization measures. The weaker findings for the potentially avoidable hospitalizations also gives one pause in attributing causality.
- The estimated Initiative effect on quality outcomes is determined by comparing the change in the percent of observed MDS assessments with each outcome in the ECCP group over the period from the pre-Initiative year of 2011 to that in 2013, to the similar change for the comparison group. Given that every outcome included in our multivariate analyses reflects negative events, a decrease in the percentage indicates quality improvement. Overall results were mixed and inconclusive. All of the ECCPs showed signs for both quality improvement and decline, depending on the quality measure, although most changes were not statistically significant. Even for the statistically significant quality improvement or decline, the changes often happened in the pre-Initiative years as well as the first Initiative year and thus cannot be entirely associated to the ECCP Initiative. Two ECCPs did not show any statistically significant effect for any quality outcomes.

The first Initiative year was designed to be a phase-in period, which, by itself, would limit the observed effectiveness. The phase-in was by groups of facilities and intervention components. The facility phase-in schedule and the type and order of the rollout for individual intervention components varied across the ECCPs, was not completed in 2013, and continued through the second year of the Initiative. The next data year, 2014, is still part of the phase-in, but the interventions should be more mature and adapted to the facilities. At this transition phase in the Initiative, the quantitative results do not show definitive effects of the Initiative.

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SECTION 1 INTRODUCTION

This report presents the status of the Centers for Medicare & Medicaid Services (CMS) Initiative to Reduce Avoidable Hospitalizations among Nursing Facility Residents (hereafter referred to as the Initiative) from the point of view of the 2014 evaluation. The Initiative is designed to affect hospitalization rates by directly changing practices at the facility level. The Initiative tests a series of clinical interventions or care models aimed at improving the health and health care of long-stay nursing facility residents, with the goals of reducing avoidable inpatient hospital admissions, improving quality metrics, and decreasing the total cost of health care spending for the Medicare-Medicaid enrollees participating in the Initiative.

The Initiative involves seven Enhanced Care and Coordination Providers (ECCPs) consisting of academic institutions, quality improvement organizations (QIOs), a health care provider network, and a hospital association. As of the time of this report, these ECCPs partnered with 146 nursing facilities in seven states to implement strategies aimed at reducing hospitalizations and improving care for fee-for-service (FFS), long-stay nursing facility residents whose care is funded through Medicare, Medicaid, or the Veterans Administration. Each ECCP designed its own interventions within the Initiative, under CMS guidance. Each of the interventions is described briefly in **Appendix A**. Two of the ECCPs, in Alabama and New York, implement the Initiative by ECCP staff educating facility staff rather than implementing a direct care component. The other ECCPs include direct patient oversight by ECCP staff as well. In brief, aside from ECCP hands-on care by nurses and advanced practice nurses, generally the interventions include introducing tools for facility staff to recognize a change of condition of a resident, to report resident condition to a physician, and to monitor pharmacy use. Other elements, specific to particular ECCPs, distinguish the interventions, as do the methods of implementation.

After CMS approved the preliminary protocols, including communication plans, readiness reviews, and operations manuals, the ECCPs began implementing their initiatives in the partner nursing facilities in February 2013. All ECCPs have staggered implementation in multiple cohorts of facilities; the last cohort began in September 2013. In addition to implementation occurring in facilities at different times, the rollout of Initiative components has been staggered over time. The facility residents eligible for the Initiative are those who have been in the facility at least 101 days and those who have Minimum Data Set (MDS) assessments indicating that there is no active discharge plan in place, irrespective of length of stay in the facility.

In this summary status report we present the results of the quantitative data analysis from the first Initiative year, 2013, covering the effects of each ECCP intervention on utilization, spending, and measures of quality of care. This analysis includes data for the entire calendar year 2013 for all participating facilities irrespective of their degree of implementation of the initiative. For each ECCP we put the quantitative results into context by describing the findings of our site visits, interviews, and surveys for 2013 and the follow-up in 2014. In Section 2 we give a brief overview of the evaluation methods. A more detailed description is in **Appendix B**. A comparison of summary utilization, spending, and quality measures across the intervention and

comparison groups in ECCP states is presented in Section 3 showing how the patterns of these measures vary. The quantitative analytical results and status of implementation of the Initiative as determined by primary data collection are described in Section 4.

The results in Section 4 are presented separately for each ECCP in Alabama, Indiana, Missouri, Nebraska, Nevada, New York, and Pennsylvania. The analytical method yields estimates of changes over time and distinguishes the ECCP-related changes from general changes shared by comparison groups. As can be seen in this report, the implementations and challenges differ by state. However, the overall picture is that of a period of transition in 2013 and continuing into 2014. The quantitative results, therefore, do not show definitive effects of the Initiative at this stage. At the time of this report the MDS and claims data for 2014 were not complete, so the second Initiative year could not yet be analyzed quantitatively. However, as part of the evaluation we also track the raw statistics for each calendar quarter through our ongoing quarterly reports to determine if any sentinel changes are occurring. No sentinel changes have been observed in the quarterly report statistics through 2014.

SECTION 2 OVERVIEW OF EVALUATION METHODS

The evaluation is designed to assess ECCP interventions as they unfold, measuring both process and outcome elements. The evaluation assesses the effectiveness of the overall Initiative as well as components of each ECCP intervention. A combination of quantitative and qualitative methods is used to evaluate the seven ECCP interventions, customizing the overarching evaluation design to (1) capture each ECCP's unique features and (2) develop an in-depth understanding of the transformative processes that may occur throughout the Initiative's implementation. This approach allows us to directly link structural and process changes to outcomes.

A principal desired outcome of the Initiative is to reduce avoidable hospitalizations. These admissions are identified by matching the principal diagnosis on acute hospital admissions to a list of conditions deemed potentially avoidable. In **Appendix C**, a table is presented with the conceptual basis for avoidable admissions, developed by RTI for another CMS project focusing on hospital admissions as cost drivers for Medicare-Medicaid beneficiaries. The conceptual list is operationalized using a set of ICD-9 diagnosis codes relating to the conditions.

Quantitative methods are used to evaluate the impact of ECCP intervention on outcomes, using a matched comparison group of non-ECCP facilities to determine the net effect of interventions. A comparison group of non-ECCP facilities with characteristics similar to ECCP facilities was identified within each state. RTI uses multivariate analyses to evaluate key utilization, spending, and quality outcomes in a difference-in-differences regression model framework. The models control for many characteristics of the resident population, clinical and demographic, as well as some facility characteristics. The main predictor variable that we focus on for the Initiative effect indicates the magnitude of the difference in the change in the measured outcome between the ECCP intervention group and the comparison group. This allows for changes over time common to both groups to be adjusted for, and for differences between the groups related to the Initiative to be measured. Greater technical detail is given in **Appendix B**.

The qualitative design focuses on primary data analyses using information collected from the ECCPs and 146 participating facilities directly. Formal site visit protocols and telephone interviews are used to ensure standardized primary data are collected. There is also a web-based survey used to collect data beyond the interviews. The primary data complement the quantitative secondary data analyses, providing critical context to interpret evaluation findings. In addition to informing secondary data analyses, the primary data analyses provide a better understanding of the ECCPs and processes of implementing various models of the Initiative in participating facilities. This in-depth qualitative approach allows us to assess the fidelity to the original Initiative design, and to gather necessary information to describe the barriers to implementation. In addition to describing the situation in 2013 related to the quantitative results, we report our findings from the primary data collection for the Initiative in 2014.

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SECTION 3 OVERVIEW OF DESCRIPTIVE FINDINGS

This section provides an overview of key quantitative findings from RTI's evaluation analysis, focusing on descriptive statistics. These data are from 2012, the year immediately preceding the Initiative. Findings from multivariate regression analyses are summarized in Section 4.

3.1 Annual Medicare Utilization Outcomes

Approximately 30 percent of all residents experienced at least one hospitalization and roughly 15 percent experienced at least one potentially avoidable hospitalization in each year. This suggests that among those residents who were ever hospitalized in a given year, approximately half of them had at least one hospitalization that was potentially avoidable. In addition, among those who ever visited the ED in a given year (without inpatient admission), approximately one third of them did so for a potentially avoidable reason. Although results showed inter-state variation in the percentages of residents who visited the ED, ranging from roughly 15 percent (New York) to 25 percent (Alabama, Missouri, and Nebraska), in each observed year the differences between the ECCP and comparison groups in the incidence of hospitalization or ED visits *within* each state are relatively small. In **Appendix D Table D.1**, the 2012 utilization differences in the study populations among and within the states are presented. This table provides a profile of hospitalization and ED use before the ECCPs started the implementation phase. The differences among the study populations across the states are among the reasons not to analyze the ECCP effects as a single study population combining all the states.

3.2 Annual Medicare Expenditures

We report the average Medicare expenditures incurred per resident, both in total and by subcategories of services covered, averaged over all residents in the ECCP group versus in the comparison group in each year. A summary of 2012 expenditures for the study population is in **Appendix D Table D.2**. The individual data behind these summary statistics are the data statistically analyzed in multivariate regression models to determine Initiative effects. Although average expenditures for ECCP facility residents generally are similar to those in the comparison group within each state, more variation is seen in spending among the states. For example, total Medicare expenditures in 2012 are higher for residents in New York (\$28,271 for ECCP and \$25,869 for comparison) and Nevada (\$24,057 for ECCP and \$23,083 for comparison) than for those in the other states. Inter-state variation also is seen in Medicare expenditures for hospitalizations and potentially avoidable hospitalizations.

One striking finding relates to the high levels of Medicare expenditure on skilled nursing facility (SNF) services, which also vary substantially among the states. In Nevada, for example, average expenditure for SNF services per ECCP facility resident amounted to \$10,194 in 2012; it was \$8,929 per comparison facility resident. This is in contrast to an average of \$6,911 per ECCP facility resident and \$4,639 per comparison facility resident in Nebraska in the same year. It is likely that much of the SNF-related expenditure is incurred by those residents included in our annual samples who were eligible for the Initiative because they did not have an active discharge plan. They are most likely short-stay patients receiving Medicare paid SNF care. Such residents are included by the Initiative protocol.

3.3 Quality Measures

The evaluation uses quality measures based on the CMS Long Term Care Minimum Data Set (MDS), the patient assessment instrument used in nursing facilities. See Appendix B for more detail. A summary of 2012 quality outcomes for the study population is in **Appendix D Table D.3**. Except for three outcomes (seasonal flu vaccine, pneumococcal vaccine and hospice care), all other quality outcomes reflect negative events. Thus higher scores indicate poorer quality. Looking within each state, the ECCP group showed better quality compared to the comparison group for some outcomes and poorer quality for others. Looking across states, for most outcomes, the ECCP groups showed better quality than the comparison group in some states while the ECCP groups in other states showed poorer quality. For two outcomes (antipsychotic medication and depressive symptoms), the ECCP group in every state showed better quality than the comparison group in the pre-initiative year, 2012.

The results also showed variations in quality across states, as well as between the ECCP and comparison groups in each state. In general, we observed greater variations across states than that within states. For example, the average percent of observed MDS assessments with self-reported moderate to severe pain in the ECCP group ranged from 3.8 percent in New York to 13.8 percent in Nebraska (3.7 percent in New York to 14.6 percent in Nebraska for the comparison group), while the difference between the ECCP and comparison groups was less than one percentage point for all states except Nevada (where the difference between the ECCP and comparison groups was 1.2 percentage point).

3.4 Facility Staffing and Inspection Deficiencies

For the most part, direct-care staffing levels are similar in the ECCP and comparison groups within each state. However, there are greater differences among the states. Similarly, the scope–severity weighted health-related deficiency scores, both overall and by subtypes (in the quality of care or quality of life domains), are relatively similar across the ECCP and comparison groups within each state. These scores reflect a weighted count of deficiency citations using a weighting scheme applied in the Nursing Home Compare quality metrics. However, they vary substantially both across the states and over time. This pattern is as expected given known discrepancies in state inspection survey practices and the level of stringency state survey agencies apply in interpreting and enforcing federal regulations.

SECTION 4

ECCP-SPECIFIC MULTIVARIATE REGRESSION RESULTS AND QUALITATIVE FINDINGS

In determining the effects of the Initiative we analyzed the data¹ for each ECCP implementation separately. Although there are commonalities in the interventions, major differences exist. There are also differences in the regulatory environment and utilization patterns in the states that make pooling undesirable. In this section, for each state, we describe the multivariate analysis results on key utilization, spending, and quality outcomes, and report on the progress of the Initiative implementations as seen from primary data collection. Overall, the multivariate analyses of Medicare utilization and spending as well as the residents' quality outcomes, which control for resident demographics, case mix, and facility characteristics, can be interpreted as having some weakly positive indicators for the Initiative. In multivariate regression analyses, we are primarily interested in estimating the *net* effect of ECCP intervention on a given outcome for residents in intervention facilities, relative to the outcome for residents in comparison facilities. Equations are created with the value of an outcome for a resident (dependent variable) set equal to some function of a set of predictor variables pertaining to the resident and facility. Statistical estimation of the strength of the effects of the predictors are made using a set of observations that characterize each resident in the study. Some of the predictors are risk adjusters, such as medical conditions of the residents and some facility characteristics. Other predictor variables account for the year of the observation, whether the resident is in one of the ECCP facilities and whether the observation is for a resident who is in an ECCP facility in an Initiative year. This last variable captures the ECCP effect of interest: the change in the outcome not shared with the comparisons after accounting for base year outcome differences between ECCP facilities and comparisons, and changes that apply to all facilities over time. A summary of some key findings from the multivariate analyses and primary data collection follows below.

The evaluation assessed differences between each ECCP and their matched comparison group on total Medicare expenditures and four utilization outcomes of interest (all-cause hospitalizations, potentially avoidable hospitalizations, all-cause emergency department (ED) visits, and potentially avoidable ED visits) in 2013 relative to 2011. Statistical significance referred to in these highlights refers to a p value for a coefficient estimate of 0.10 or lower (better). This p value means a 10% probability of observing an estimate of at least that magnitude by chance. When many estimates are generated and tested, the probability of observing some estimates this large is greater than 10%. More information on the analysis is given in *Appendix B*.

¹ Only Medicare claims could be analyzed at this time because of delays in acquiring and processing Medicaid data from the states. The main effects of the Initiative are expected to be visible in the Medicare data.

Estimates of the ECCP effect on utilization and expenditure outcomes:

- **Alabama:** The estimate was in the desired direction (a reduction) in each of the four utilization outcomes. The estimate was statistically significant for the probability of any ED visit and for a potentially avoidable hospitalization.

For total Medicare expenditures the estimate was a reduction and was statistically significant.

- **Indiana:** The estimate was in the undesired direction (an increase) in each of the four utilization outcomes, however none were statistically significant.

The ECCP effect on total Medicare expenditures was an increase, but not large enough to be statistically significant.

- **Missouri:** The estimate was in the desired direction (a reduction) for any hospitalization and a potentially avoidable hospitalization. It was significant only for the first outcome. The outcomes for ED visits and potentially avoidable ED visits showed increases, but the magnitudes were not statistically significant.

The estimated effect on total Medicare expenditure was an increase, but not of a statistically significant magnitude.

- **Nebraska:** The estimate was in the desired direction (a reduction) in each of the four utilization outcomes, with only the all-cause hospitalization estimate statistically significant.

The estimated ECCP effect on Medicare expenditures in Nebraska was a decrease that was statistically significant.

- **Nevada:** The estimate was in the desired direction (a reduction) for all-cause hospitalizations, potentially avoidable hospitalizations and any ED visit. There was an increase in the probability of a potentially avoidable ED visit. However none of the estimates were statistically significant.

The estimated effect on Medicare expenditures was a decrease that was not statistically significant.

- **New York:** The estimate was in the undesired direction (an increase) for all but the potentially avoidable hospitalizations. The latter had a reduction. None of the estimates was statistically significant.

The ECCP effect on Medicare expenditures in New York was an increase that was not statistically significant.

- **Pennsylvania:** The estimate was in the desired direction (a reduction) in each of the four utilization outcomes, and all were statistically significant.

The ECCP effect on Medicare expenditures paralleled that for the utilization outcomes, a decrease that was statistically significant.

Estimates of the net effect of the ECCP intervention on eight quality outcomes of interest in 2013 relative to 2011:

- The intervention effect was inconsistent across ECCPs and individual measures, with results generally not reaching the level of statistical significance. These largely statistically insignificant results suggest no meaningful ECCP intervention effect to date on quality of care.

A summary of some key findings from primary data collection:

- Implementation occurred in phases, with ECCPs rolling out their interventions by cohorts of participating nursing facilities. The facility rollout was generally complete by summer 2013, however the last facilities in New York and Pennsylvania did not go live until fall 2013.
- Some ECCPs also implemented the components of their interventions in phases throughout 2013 and in certain cases continuing into 2014. For example, Pennsylvania operationalized the telemedicine component of its intervention in mid-2014. The web survey indicated the intervention components were reported to be fully implemented in less than 50% of facilities in all states by summer of 2014.
- All ECCPs reported challenges related to turnover of nursing and/or administrative staff.

A more detailed description of the findings for the Initiative in each state is given below. In addition to a description of the analytical results in each state we include a table indicating whether the ECCP intervention coefficient had a negative sign, indicating a relative reduction in the outcome, or a positive sign, indicating a relative increase. Reductions are what are desired for the outcomes measured in this analysis. Asterisks in these tables indicate statistical significance, with one asterisk indicating the 0.10 level of significance ($p < 0.10$). The variables reported are the intervention effect from the 2011 base year to 2013, and the differences between the ECCP and comparison groups in each of the 3 years. Negative symbols on these year variables indicate the ECCP group had lower levels of utilization, spending or adverse quality than the comparison group. The individual year variables for ECCP–comparison differences are helpful in discerning whether the ECCP group started with higher or lower levels of the measure and whether there were changes occurring even in the period prior to the Initiative implementation.

4.1 Summary of Findings: Alabama

The Alabama Quality Assurance Foundation's (AQAF) version of the Initiative is based on education, rather than hands-on care by ECCP staff in the facilities. This ECCP had nursing facility agreements in place at the end of 2012; however, not all registered nurse (RN) staff members were hired until the spring of 2013. About half of the 23 nursing facilities had go-live dates in February and the remainder started by the end of May 2013. AQAF's activities focus on

education and data collection, which appear to have contributed to a 50 percent turnover of ECCP facility-based staff within the first year. This turnover rate is thought to be attributable to RNs' lack of computer skills and their preference for more clinical work. In 2014, adjustments to the ECCP model included the addition of a floating ECCP RN to assist during ECCP RN absences, including turnover. Data collection plays an important role, with ECCP RNs reporting to the evaluator that 60 percent of their time is spent on both the CMS/Deloitte data requirements and ECCP-specific data collection tasks. ECCP leadership reports that they envision these data collection efforts leading to a successful evidence-based model that can be implemented across facilities statewide.

The outcomes for AQA (Alabama) are summarized in **Table 1**. The estimate of the net ECCP effect in 2013 relative to 2011 was in the desired direction (negative) and statistically significant in three of the five utilization and expenditure outcomes modelled: the probability of any potentially avoidable hospitalization, of any (all-cause) ED visit, and for total Medicare spending. The ECCP effect was in the desired direction but not statistically significant in models predicting overall hospitalizations and any potentially avoidable ED visit. Although these changes are in the desired direction, they are not consistently significant across the outcomes. The last three columns in Table 1 indicate the differences between the ECCP and comparison group in each of the years, including the two pre-Initiative baseline years (2011 and 2012). In 2011, the ECCP group had a marginally higher hospitalization rate than the comparison group; in 2012 and 2013 hospitalization rates were essentially the same for both groups. There was no significant baseline difference between ECCP and comparison groups in 2011 or 2012 for potentially avoidable hospitalizations; in 2013, the rate was marginally lower in the ECCP group. For all-cause ED visits, the rate was significantly higher in the ECCP group than in the comparison group in 2011; this difference was reduced, but still remained positive although not significant, in 2012 (prior to the intervention) and in 2013. Similarly, the rate of potentially avoidable ED visits was marginally higher in the ECCP group than in the comparison group in 2011, but this difference diminished in 2013.

In 2011, total annual Medicare spending per person was roughly 12 percent higher, on average, in the ECCP group than in the comparison group. However, there was a trend of significant spending reduction in the ECCP group, resulting in marginally lower spending in the ECCP group by 2013. Although the estimates suggest an overall trend of reduced utilization and total Medicare spending in the ECCP group relative to the comparison group, not all the changes are statistically significant. It must be noted that there are changes between the two baseline years (before the start of the Initiative) as well. Given the non-significant evidence of improvements and only the 2013 transition year data included in these analyses, the effect of the ECCP intervention thus far should be interpreted with caution.

Table 1
Summary of ECCP intervention effects on utilization, expenditure, and quality outcomes, Alabama

Outcome	ECCP Effect: 2011 to 2013	ECCP- Comp Difference 2011	ECCP- Comp Difference 2012	ECCP- Comp Difference 2013
<i>Utilization</i>				
Any hospitalization	—	+ *	+	—
Any potentially avoidable hospitalization	— *	+	—	— *
Any ED visit	— ***	+ ***	+	+
Any potentially avoidable ED visit	—	+ *	+	+
<i>Expenditure</i>				
Total Medicare expenditure	— ***	+ **	+	—
<i>Quality</i>				
Falls with injury	—	+	+	—
Self-report moderate to severe pain	+	+	—	+
Urinary tract infection	+	—	—	+
ADL decline	+	—	—	+
Depressive symptoms	—	+	—	+
Use of antipsychotics	— *	+	—	—
Pressure ulcers	— **	—	—	— *
Catheter use	+	+ *	+	+ *

NOTE: ECCP = Enhanced Care and Coordination Providers; Comp = comparison; ED = emergency department; ADL = activity of daily living.

Minus sign “—” indicates a negative coefficient (relative improvement for ECCP effect 2011 to 2013 or lower level for ECCP-Comp difference within year); plus sign “+” indicates a positive coefficient (relative worsening for ECCP effect 2011 to 2013 or higher level for ECCP-Comp difference within year).

Symbols in brackets indicate levels of statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, else not significant ($p \geq 0.10$).

The ECCP effect from 2011 to 2013 suggests that the ECCP group showed improvement relative to the comparison group for four of eight quality outcomes. Two (use of antipsychotics and pressure ulcers) indicated a statistically significant ECCP effect. The ECCP Initiative showed an effect in the undesired direction (indicating worsening outcomes) for four outcomes, although none of these undesired effects was statistically significant. There were also variations in quality between the ECCP and comparison groups in the two baseline years as well as in the first Initiative year. Thus, we cannot draw conclusions on the effect of Alabama’s ECCP Initiative on quality of care.

Given the evidence presented, and that 2013 was a transition year, the effect of the ECCP intervention is not clear and no strong conclusions can be drawn. In addition, the effect of implementation delays of the Initiative needs to be considered. ECCP staff turnover contributed to delays in implementing some of the interventions, including training on INTERACT (Interventions to Reduce Acute Care Transfers) tools. According to our Web-based survey data collected in August/September 2014, only 10 percent of AQAF-NFI facilities reported having fully implemented all components. Because 2013 was the transition year and implementation of the interventions was delayed, it cannot be ruled out that factors other than the ECCP activities contributed to the quantitative findings.

4.2 Summary of Findings: Indiana

Indiana University's Optimizing Patient Transfers, Impacting Medical quality, and Improving Symptoms: Transforming Institutional Care (OPTIMISTIC) project places trained RNs in each facility to provide direct clinical support, education, and training to nursing facility staff. It also provides six advanced practice registered nurses (APRNs) to support these RNs. OPTIMISTIC findings should be understood in the context of the Initiative's implementation. Although all but one OPTIMISTIC facility were rolled out in two main cohorts in February and April 2013, the last remaining facility only implemented the Initiative in May 2013; therefore, only 7 months of full implementation happened in this calendar year. Moreover, the ECCP reported having major difficulties recruiting nurse practitioners (NPs), with the final two NPs having been hired only in September 2013. Therefore, for most of 2013, there were just four ECCP NPs covering all 19 facilities, presumably reducing access to support that NPs could provide the ECCP RN and facility staff. This also reduced the number of residents who could receive Transition and Acute Change in Condition Visits and Collaborative Care Reviews from the NPs. Several components of the intervention were still being rolled out during the latter half of 2013 and early 2014. Moreover, staff at participating facilities indicated that initial acceptance of new tools by facility staff proved challenging; so implementation of multiple interventions was delayed while the ECCP leadership worked with facilities to develop rapport and acceptance. The ECCP reported not being able to implement all tools/interventions as planned because they were reluctant to press the facilities to adopt new practices when they met strong resistance.

Turnover of facility leadership and the need to establish relationships with staff in participating facilities were also reported as factors in slowing down the implementation. In addition, the web-based data component (REDCap) of the ECCP also took several months to roll out at the beginning of the project, but has reduced the amount of time that ECCP nursing staff spend on data collection, freeing up time for other OPTIMISTIC activities. In 2014, the ECCP began sending data reports to facility leadership and some ECCP facility staff were beginning to present findings during facility quality improvement meetings.

The outcomes for OPTIMISTIC (Indiana) are summarized in **Table 2**. The estimated net ECCP effect in 2013 relative to 2011 was in the undesirable direction (positive) for all the five utilization and expenditure outcomes, although none of them was statistically significant. This suggests that there was no improvement in these outcomes in the ECCP group relative to the comparison group between 2011 and 2013. It should be noted that the ECCP group started in 2011 with somewhat lower (more desirable) rates than the comparison group on all five

utilization and expenditure outcomes. However, the overall ECCP–comparison difference vanished in all of the utilization and expenditure outcomes in 2012 and in all but one outcome, overall ED visits, in 2013. Together, these patterns point to undesirable changes or comparatively worse performance over time in the ECCP group.

Table 2
Summary of ECCP intervention effects on utilization, expenditure, and quality outcomes, Indiana

Outcome	ECCP Effect: 2011 to 2013	ECCP- Comp Difference 2011	ECCP- Comp Difference 2012	ECCP- Comp Difference 2013
<i>Utilization</i>				
Any hospitalization	+	— *	+	—
Any potentially avoidable hospitalization	+	—	+	—
Any ED visit	+	— **	—	— **
Any potentially avoidable ED visit	+	— **	+	—
<i>Expenditure</i>				
Total Medicare expenditure	+	—	+	+
<i>Quality</i>				
Falls with injury	+	+	+	+
Self-report moderate to severe pain	—	+	—	—
Urinary tract infection	+	—	+	+
ADL decline	+	—	—	+
Depressive symptoms	—	—	—	—
Use of antipsychotics	—	—	+	—
Pressure ulcers	—	— *	—	—
Catheter use	+	— **	—	—

NOTE: ECCP = Enhanced Care and Coordination Providers; Comp = comparison; ED = emergency department; ADL = activity of daily living.

Minus sign “—” indicates a negative coefficient (relative improvement for ECCP effect 2011 to 2013 or lower level for ECCP-Comp difference within year); plus sign “+” indicates a positive coefficient (relative worsening for ECCP effect 2011 to 2013 or higher level for ECCP-Comp difference within year).

Asterisks indicate levels of statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, else not significant ($p \geq 0.10$).

The ECCP effect from 2011 to 2013 in Indiana was not statistically significant for any of the quality outcomes. The ECCP group showed signs of both quality improvement (for four outcomes) and decline (for four outcomes) relative to the comparison group; these changes happened in the first Initiative year as well as across the two baseline years. These results thus indicate no meaningful ECCP intervention effect on quality of care.

In summary, as of 2013 there was a lack of significant ECCP effects on utilization and spending and of meaningful changes in quality measures in Indiana. However, this should be understood in the context of the Initiative's implementation, with 2013 as a transition year and only 7 months of incomplete implementation by the year end. The ECCP reported having major difficulties recruiting NPs and some difficulty with initial acceptance of new tools at the participating facilities. Moreover, several components of the intervention were still being rolled out during the latter half of 2013 and early 2014. According to our Web-based survey data, as of August/September 2014, only 41 percent of OPTIMISTIC facilities reported having fully implemented all components.

Results may become stronger and more consistent when additional years of data in which the Initiative has been fully implemented are added to the analysis.

4.3 Summary of Findings: Missouri

Missouri Quality Initiative for Nursing Homes (MOQI) is implementing INTERACT III tools and processes, placing an advanced practice registered nurse (APRN) in each nursing facility for education, coaching, and care provision (without writing orders), and developing better connections between nursing facilities and hospitals with innovative IT approaches. The Missouri ECCP had agreements with all participating facilities in the fall of 2012 and had hired eight APRNs for deployment in facilities by January 2013; however, hiring continued through the summer. By July 2013, all 16 ECCP facilities were staffed with an APRN who provides hands-on care, but could not write orders for facility residents. Go-live dates ranged from February through August 2013 when ECCP staff were operational and activities began in facilities.

In 2013, APRNs began providing facility staff training on INTERACT tools, conducting medication reconciliation, working to reduce antipsychotic use, and working with quality improvement committees to review causes of transfers and improve transfer processes. The ECCP provided additional coaches, including social workers, to support facility staff use of INTERACT tools and end-of-life care. Integration and acceptance of ECCP activities in facilities were concerns during 2013, and consequently not all interventions were readily accepted initially, including uptake of the INTERACT tools by nursing and social work staff. Turnover in facility leadership and staff as well as APRNs was a challenge. Buy-in from leadership was unenthusiastic in some facilities as well. Another limitation was that there were no collaborative practice agreements (CPAs) in place in this first Initiative year; rapid action addressing patient issues could not always occur as would be desired. During the next year, 2014, APRN integration improved; most facilities had incorporated the APRNs into facility activities, including quality assurance reviews of transfers, care planning meetings, and in-services. Social worker involvement also increased appreciably in 2014. Although health information technology (HIT) plays an important role in this ECCP, the CareMail system remained in the pilot phase going into 2014. The low technological capabilities of many facilities also presented a challenge and the ECCP subsidized some facilities in this respect. According to our Web-based survey data collected in August/September 2014, only 13 percent of MOQI facilities reported having fully implemented all components.

The outcomes for MOQI (Missouri) are summarized in **Table 3**. The estimate of the net ECCP effect in 2013 relative to 2011 was in the desired direction (negative) and statistically

significant for only one utilization or expenditure outcome: the probability of having any (all-cause) hospitalization. For potentially avoidable hospitalizations, the ECCP effect was in the desired direction but was not statistically significant. The ECCP effect was in the undesired direction but not statistically significant for the remaining three utilization and expenditure outcomes: all-cause ED visits, potentially avoidable ED visits, and total Medicare expenditure. Overall, the estimated ECCP effects are inconsistent and not uniform in direction across utilization and expenditure outcomes.

Table 3
Summary of ECCP intervention effects on utilization, expenditure, and quality outcomes, Missouri

Outcome	ECCP Effect: 2011 to 2013	ECCP- Comp Difference 2011	ECCP- Comp Difference 2012	ECCP- Comp Difference 2013
<i>Utilization</i>				
Any hospitalization	— ***	+ **	+ **	—
Any potentially avoidable hospitalization	—	+ **	+ ***	+
Any ED visit	+	—	—	—
Any potentially avoidable ED visit	+	—	+	—
<i>Expenditure</i>				
Total Medicare expenditure	+	+	+	+
<i>Quality</i>				
Falls with injury	+	—	+	+
Self-report moderate to severe pain	+	—	—	+
Urinary tract infection	+ **	—	—	+
ADL decline	+	—	—	+
Depressive symptoms	+	—	—	+
Use of antipsychotics	—	— **	—	—
Pressure ulcers	—	+	+	—
Catheter use	— **	+	—	—

NOTE: ECCP = Enhanced Care and Coordination Providers; Comp = comparison; ED = emergency department; ADL = activity of daily living.

Minus sign “—” indicates a negative coefficient (relative improvement for ECCP effect 2011 to 2013 or lower level for ECCP-Comp difference within year); plus sign “+” indicates a positive coefficient (relative worsening for ECCP effect 2011 to 2013 or higher level for ECCP-Comp difference within year). Asterisks indicate levels of statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, else not significant ($p \geq 0.10$).

The last three columns in **Table 3** indicate the direction of the overall differences between the ECCP and comparison groups in each year. The rate of overall (all-cause) hospitalizations was significantly higher in the ECCP group than in the comparison group in 2011. There is a

slight reduction of the excess in the ECCP group in 2012 but the overall difference between the two groups remained positive and significant. A larger reduction in the rate of overall (all-cause) hospitalizations in the ECCP group relative to the comparison group occurred between 2011 and 2013, making the difference negligible in 2013. The rate of potentially avoidable hospitalizations followed a similar pattern.

The ECCP group showed improvement relative to the comparison group for three of eight quality outcomes and decline for the other five outcomes as indicated by the ECCP effect from 2011 to 2013. Two coefficients indicated a statistically significant ECCP effect. Quality improvement was seen for catheter use but quality decline for urinary tract infection in the ECCP group. The quality improvement for catheter use in the ECCP group, however, started during the baseline period (2012). The ECCP effect was not statistically significant for other quality outcomes. Therefore, there was no evidence to suggest that the ECCP Initiative in Missouri had any impact on quality of care.

Given the inconsistent findings illustrated above, the effect of the ECCP intervention is not clear enough to support any strong conclusions. Although one quality measure was improved in the ECCP group relative to the comparison group, another was worsened. The higher overall hospitalization rates in the ECCP group relative to the comparison group, as seen in both of the two baseline years (2011 and 2012), were reduced in 2013. However, the other utilization measures do not support this statistical finding. These inconsistent effects may reflect the incremental progress in the implementation of ECCP interventions in Missouri during 2013.

4.4 Summary of Findings: Nebraska

Alegent + Creighton Health continues to operate with a team of six NPs in 15 nursing facilities, but the clinical care component has not been fully implemented. Specifically, in 2013, 15 participating facilities were separated into three staggered implementation cohort groups, each with separate launch dates ranging from February through June. For the first half of the year, several facilities had not yet gone live for the Initiative, and in June 2013, implementation was reported to still be “in infancy.” The ECCP experienced initial turnover of NPs, which necessitated spending time training new NPs and rearranging facility assignments. Additional challenges included reports of significant physician pushback at the start and low awareness of the Initiative among staff in several facilities. Facility staff turnover was reported to be a major barrier to the successful implementation of the Initiative. Moreover, several planned ECCP activities such as History and Physical examinations and Life Issue Reviews were scaled down in scope compared to the original model design. The dental model component that sets Nebraska’s model apart from other ECCPs, was a relatively weak intervention at this time, as much of the base year was spent procuring proper equipment and assessing the oral health of residents. The dental hygienist, under the supervision of a dentist, provided oral health/hygiene coaching and education and dental prophylaxis oral care to approximately 50 percent of the eligible residents in 2013. Finally, several participating facilities reported that they had undergone other internal efforts, such as using INTERACT tools or employing a respiratory therapist, to reduce avoidable hospitalizations before the implementation of the Initiative. According to our Web-based survey data collected in August/September 2014, only 42 percent of Alegent + Creighton facilities reported having fully implemented all components.

The outcomes for Alegent + Creighton (Nebraska) are summarized in **Table 4**. The estimated net ECCP effect in 2013 relative to 2011 was in the desired direction (negative) and statistically significant for two utilization outcomes: any (all-cause) hospitalization and total Medicare expenditure, suggesting improvements relative to the comparison group. The ECCP effect was in the desired direction but not significant on the remaining three outcomes: any potentially avoidable hospitalization, any (all-cause) ED visit, and any potentially avoidable ED visit. Thus, the changes in utilization and expenditure are in the desired direction but not consistently significant across the outcomes. In addition, as illustrated by the three rightmost columns of **Table 4**, annual total Medicare spending per person was higher in the ECCP group than in the comparison group in both 2011 and 2012. However, this gap was essentially closed by 2013 because of improvement over time in the ECCP group relative to the comparison group.

Table 4
Summary of ECCP intervention effects on utilization, expenditure, and quality outcomes, Nebraska

Outcome	ECCP Effect: 2011 to 2013	ECCP- Comp Difference 2011	ECCP- Comp Difference 2012	ECCP- Comp Difference 2013
<i>Utilization</i>				
Any hospitalization	— *	—	+	— ***
Any potentially avoidable hospitalization	—	+	—	—
Any ED visit	—	+	—	—
Any potentially avoidable ED visit	—	+	—	—
<i>Expenditure</i>				
Total Medicare expenditure	— *	+ **	+ *	+
<i>Quality</i>				
Falls with injury	+	—	—	—
Self-report moderate to severe pain	+	—	—	—
Urinary tract infection	+	—	—	—
ADL decline	—	+	+	+
Depressive symptoms	+	—	—	—
Use of antipsychotics	—	— *	—	— **
Pressure ulcers	+	+	+	+
Catheter use	+	— **	—	—

NOTE: ECCP = Enhanced Care and Coordination Providers; Comp = comparison; ED = emergency department; ADL = activity of daily living.

Minus sign “—” indicates a negative coefficient (relative improvement for ECCP effect 2011 to 2013 or lower level for ECCP-Comp difference within year); plus sign “+” indicates a positive coefficient (relative worsening for ECCP effect 2011 to 2013 or higher level for ECCP-Comp difference within year). Asterisks indicate levels of statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, else not significant ($p \geq 0.10$).

The ECCP effect from 2011 to 2013 in Nebraska was not statistically significant on any of the quality outcomes. The ECCP group showed signs of weak quality improvement for two outcomes and decline for six outcomes relative to the comparison group. These statistically insignificant results indicate no meaningful ECCP intervention effect on quality of care.

In short, the net ECCP effects in 2013 relative to 2011 on utilization and spending are in the desired direction, which, however, are not consistent in statistical significance. Overall, the ECCP group in Nebraska showed no meaningful changes in all quality measures examined relative to the comparison group. Although the direction of the change in utilization and spending outcomes is promising, no strong conclusions regarding the effects of the Initiative in Nebraska can be drawn at this time.

4.5 Summary of Findings: Nevada

Nevada's Admissions and Transitions Optimization Program (ATOP) program centers around one APRN and two RNs providing clinical support, training, and education to four to five nursing facilities in each of five pods (groups of facilities) and by creating "rapid response teams" to address changes in condition and using a Resident Registry data system to collect and share data. Although all agreements had been executed by January 2013, ECCP RNs were not in place in all facilities until April 2013 and all APRNs had not been hired and active in facilities until May 2013. ECCP facility-based staff integration was not easy in all facilities and additional clarity of the APRN role was requested by medical staff in a number of facilities before APRNs were allowed access to all residents. Each participating facility requested training in topics to meet their specific needs and the ECCP provided tailored trainings. During 2013, after data had been entered into the ECCP's registry, APRN staff began reviewing medications for polypharmacy, inappropriate use of psychotropic medications, and identification of medications associated with falls. The INTERACT quality improvement tool for root cause analysis was introduced into all facilities and in 2014, because of the high turnover of facility staff, ECCP RNs and APRNs repeated trainings for Certified Nursing Assistants (CNAs) and facility nurses in the use of INTERACT tools.

There is one other situation for Nevada's implementation that could have effects on the results. The comparison group is every non-ECCP long-term care nursing facility in the state and has fewer facilities than the ECCP group. There are relatively few facilities in the state. In other states the comparison group is about twice as large as the ECCP group. This does not preclude finding Initiative effects, but the sample difference should be recognized. According to our Web-based survey data collected in August/September 2014, only 33 percent of ATOP facilities reported having fully implemented all components.

The outcomes for ATOP (Nevada) are summarized in **Table 5**. The estimate of the net ECCP effect in 2013 relative to 2011 was in the desired direction (negative) but not significant in four of the five utilization and expenditure outcomes: any (all-cause) hospitalization, any potentially avoidable hospitalization, any (all-cause) ED visit, and total Medicare expenditure. The ECCP effect was in the undesirable direction (positive) but not significant for any potentially avoidable ED visit. Overall, these changes point to relative reductions in most of the utilization and expenditure outcomes in the ECCP group but none have reached an acceptable level of statistical significance.

The last three columns of Table 5 show the overall ECCP–comparison difference in each year. The ECCP–comparison difference was not significant for any utilization outcome in any year, with one exception: in 2012 (prior to the intervention), total Medicare spending is marginally higher in the ECCP group than in the comparison group.

Table 5
Summary of ECCP intervention effects on utilization, expenditure, and quality outcomes, Nevada

Outcome	ECCP Effect: 2011 to 2013	ECCP- Comp Difference 2011	ECCP- Comp Difference 2012	ECCP- Comp Difference 2013
<i>Utilization</i>				
Any hospitalization	—	—	+	—
Any potentially avoidable hospitalization	—	+	—	—
Any ED visit	—	+	+	+
Any potentially avoidable ED visit	+	+	+	+
<i>Expenditure</i>				
Total Medicare expenditure	—	+	+ *	—
<i>Quality</i>				
Falls with injury	+ ***	—	—	+ *
Self-report moderate to severe pain	—	—	+	—
Urinary tract infection	+ *	—	—	+
ADL decline	+ **	—	+	+
Depressive symptoms	+	—	—	—
Use of antipsychotics	—	+	—	—
Pressure ulcers	+	—	+	+
Catheter use	+	+	+	+

NOTE: ECCP = Enhanced Care and Coordination Providers; Comp = comparison; ED = emergency department; ADL = activity of daily living.

Minus sign “—” indicates a negative coefficient (relative improvement for ECCP effect 2011 to 2013 or lower level for ECCP-Comp difference within year); plus sign “+” indicates a positive coefficient (relative worsening for ECCP effect 2011 to 2013 or higher level for ECCP-Comp difference within year).

Asterisks indicate levels of statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, else not significant ($p \geq 0.10$).

The ECCP effect from 2011 to 2013 suggests that the ECCP group showed improvement relative to the comparison group for two of eight quality outcomes, but neither effect was statistically significant. The ECCP effect indicates quality decline in the ECCP group relative to the comparison group for the remaining six outcomes. In particular, three of these outcomes (falls with injury, urinary tract infection, and activities of daily living [ADL] decline) saw a

statistically significant quality decline in the ECCP group. Quality changes in either direction in the ECCP group happened in baseline years as well as the first Initiative year. Thus, these findings are likely driven by forces other than true quality trend caused by the ECCP Initiative.

Given these results and the fact that 2013 was a transition year, it is unlikely that the changes in quantitative outcomes discussed above are attributable to the Initiative in Nevada. During 2013, the ECCP staff were in the nascent stages of becoming integrated into the participating facilities, beginning trainings on INTERACT tool use, and other interventions. It is also important to note that because there are relatively few facilities in the state, Nevada's comparison group is smaller than other ECCPs. It is not clear how this will affect the results observed in later years.

4.6 Summary of Findings: New York

This ECCP is entirely education focused: the RN Care Coordinators (RNCCs) in the New York Reducing Avoidable Hospitalizations (NY-RAH) intervention do not provide clinical care to residents but focus on increasing each facility's capacity to identify root causes for potentially avoidable hospitalizations and review and modify its policies and procedures to prevent such hospitalizations. They also focus on developing or modifying policies and procedures to improve transitions and ensuring that all residents have the opportunity to engage in advance care planning and receive palliative care when desired and facilitating the implementation of electronic solutions to improve unavoidable transitions to the hospital and back to the nursing facility. The NY-RAH had a slow start. The ECCP began operations much later than other ECCPs because of the impact of Hurricane Sandy in late 2012, which affected many of the participating nursing facilities in the greater New York area. All RNs were hired for all facilities only by October 30, 2013. Other start-up activities resulted in go-live dates of May in about half of the facilities, with the remainder starting by September 2013. A comprehensive assessment was the first activity performed by ECCP RNs in the facilities; these were completed between July and November 2013. This activity was followed by developing an action plan, tailored to the needs of each facility, to guide the ECCP nurses' trainings and activities in the facilities. ECCP RNs provided INTERACT training in late 2013 and early 2014. Other important components were still being phased in through 2014: The American Medical Directors Association (AMDA) tool (Know-It-All-Before-You-Call cards) to improve staff communication and nursing assessment skills, INTERACT palliative care communications, MOLST (Medical Orders for Life Sustaining Treatment) forms, and direct messaging mailboxes, an electronic solution designed to improve communication among nursing facilities and hospitals. According to our Web-based survey data collected in August/September 2014, only 12 percent of NY-RAH facilities reported having fully implemented all components.

The outcomes for NY-RAH (New York) are summarized in **Table 6**. The net ECCP effects in 2013 relative to 2011 were not significantly different from zero, indicating no discernable improvements in any of the utilization and expenditure outcomes in the ECCP group relative to the comparison group. The ECCP effect was in the desired direction (negative) on only one outcome, regarding potentially avoidable hospitalizations, but the effect was negligible and not statistically significant. The ECCP effect was not in the desired direction for the remaining utilization outcomes, which were also negligible and not statistically significant. In

fact, the overall ECCP–comparison difference is not statistically significant in any of the utilization outcomes for any of the years analyzed.

Table 6
Summary of ECCP intervention effects on utilization, expenditure, and quality outcomes, New York

Outcome	ECCP Effect: 2011 to 2013	ECCP- Comp Difference 2011	ECCP- Comp Difference 2012	ECCP- Comp Difference 2013
<i>Utilization</i>				
Any hospitalization	+	+	+	+
Any potentially avoidable hospitalization	—	+	+	+
Any ED visit	+	+	+	+
Any potentially avoidable ED visit	+	+	+	+
<i>Expenditure</i>				
Total Medicare expenditure	+	+	+	+
<i>Quality</i>				
Falls with injury	—	+ **	+ **	+
Self-report moderate to severe pain	+	—	+	+
Urinary tract infection	—	+	—	—
ADL decline	+	— **	—	—
Depressive symptoms	—	—	—	—
Use of antipsychotics	—	—	—	—
Pressure ulcers	+	+	+	+
Catheter use	+ *	—	+	+

NOTE: ECCP = Enhanced Care and Coordination Providers; Comp = comparison; ED = emergency department; ADL = activity of daily living.

Minus sign “—” indicates a negative coefficient (relative improvement for ECCP effect 2011 to 2013 or lower level for ECCP-Comp difference within year); plus sign “+” indicates a positive coefficient (relative worsening for ECCP effect 2011 to 2013 or higher level for ECCP-Comp difference within year).

Asterisks indicate levels of statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, else not significant ($p \geq 0.10$).

The ECCP effect from 2011 to 2013 suggests that the ECCP group showed improvement relative to the comparison group for half of the quality outcomes and decline for the other half. The ECCP effect was statistically significant for one outcome only, indicating relative quality decline in the ECCP group for catheter use. However, according to the estimated yearly differences between the ECCP and comparison groups, the quality decline in the ECCP group started in 2012, which is a baseline year. Therefore, we cannot associate this change to the ECCP Initiative and thus cannot draw any conclusion on the effect of the Initiative on quality of care.

Given the evidence presented it is unlikely the quantitative outcomes for 2013 data are associated with NY-RAH's specific activities. The very weak changes in New York may be a result of the slow start of the Initiative there, not necessarily because of the nature of the education-only focus of the intervention. There may also be fewer randomly significant effects observed because the sample in New York is much larger than in other states.

4.7 Summary of Findings: Pennsylvania

The most valued element of the University of Pittsburgh Medical Center Community Provider Services Program to Reduce Avoidable Hospitalizations using Evidence-based Interventions for Nursing Facilities (UPMC-RAVEN) was reported to be the clinical care provided by UPMC-RAVEN NPs in the facilities where they can assess, write orders, and provide hands-on care under a CPA. The RAVEN rollout was gradual, spanning five facility cohorts, the last of which implemented in the fall of 2013. Even within a given cohort, rollout has varied by individual facility needs and schedules. RAVEN model components (training and INTERACT tool use) were introduced on different schedules across facilities; moreover, each facility had a different education schedule, with some facilities only completing the initial training by the end of 2014. Staggered rollout also translated into some components only being implemented in the second project year: after significant delays, telemedicine carts became operational in the middle of 2014 with only a few actual consultations reported by June 2014, and the telemedicine training was conducted through the second year as well. In 2013, the initial pharmacy review was still in progress; RxPartners did not start generating pharmacy recommendations until the middle of 2014. Rolling out components of the RAVEN program on different schedules across facilities resulted in protracted implementation spanning the initial 24 project months. There are some low-performing, extra-large, county-owned facilities in urban and rural settings where staff reported residents with unusually high acuity levels. Some recruited facilities are located in remote rural areas, which also affected the ability of the ECCP to hire and retain qualified staff. According to our Web-based survey data collected in August/September 2014, 38 percent of UPMC-RAVEN facilities reported having fully implemented all components.

The outcomes for UPMC-RAVEN (Pennsylvania) are summarized in **Table 7**. The estimated net ECCP effects in 2013 relative to 2011 were in the desirable direction (negative) and statistically significant on all of the utilization and expenditure outcomes. The size and significance levels of the ECCP effects on utilization and expenditure outcomes indicate a solid trend of reductions in these outcomes in the ECCP group relative to the comparison group, between 2011 and 2013.

Nevertheless, this trend should be assessed against the baseline difference between the ECCP and comparison groups for each of these outcomes. Indeed, the rates of all utilization outcomes and levels of Medicare expenditure are statistically significantly higher in the ECCP group than in the comparison group in 2011 and 2012, with one exception; the rate of all-cause ED visits in 2012, was higher in the ECCP group but not statistically significant. With steady improvements over time, by 2013, the ECCP group appeared to have reduced utilization rates and spending to levels comparable to the comparison group. If these trends continue, the ECCP group may be able achieve further reductions and eventually cost savings.

The ECCP effect from 2011 to 2013 suggests that the ECCP group showed improvement relative to the comparison group for half of the quality outcomes. Two quality outcomes (ADL decline and catheter use) indicated a statistically significant ECCP effect from 2011 to 2013. The estimated yearly differences between the ECCP and comparison groups show that the changes in these two quality outcomes started in 2012, which is a baseline year. The ECCP group showed quality decline relative to the comparison group for four outcomes; none of these changes was statistically significant. These results indicate no meaningful ECCP intervention effect on quality of care.

Table 7
Summary of ECCP intervention effects on utilization, expenditure, and quality outcomes, Pennsylvania

Outcome	ECCP Effect: 2011 to 2013	ECCP- Comp Difference 2011	ECCP- Comp Difference 2012	ECCP- Comp Difference 2013
<i>Utilization</i>				
Any hospitalization	— ***	+ ***	+ *	—
Any potentially avoidable hospitalization	— ***	+ ***	+ **	+
Any ED visit	— ***	+ ***	+	+
Any potentially avoidable ED visit	— ***	+ ***	+ **	+
<i>Expenditure</i>				
Total Medicare expenditure	— ***	+ ***	+ ***	—
<i>Quality</i>				
Falls with injury	+	+ **	+ *	+
Self-report moderate to severe pain	+	—	—	+
Urinary tract infection	+	+ *	+	+ *
ADL decline	— **	+	—	—
Depressive symptoms	—	+	+	+
Use of antipsychotics	—	+ **	+	+
Pressure ulcers	+	+	+	+
Catheter use	— **	+ ***	+	+

NOTE: ECCP = Enhanced Care and Coordination Providers; Comp = comparison; ED = emergency department; ADL = activity of daily living.

Minus sign “—” indicates a negative coefficient (relative improvement for ECCP effect 2011 to 2013 or lower level for ECCP-Comp difference within year); plus sign “+” indicates a positive coefficient (relative worsening for ECCP effect 2011 to 2013 or higher level for ECCP-Comp difference within year).

Asterisks indicate levels of statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, else not significant ($p \geq 0.10$).

The evidence presented above indicates that in Pennsylvania there were reductions in utilization and spending outcomes in the ECCP group relative to the comparison group, between 2011 and 2013, and mixed effects on quality measures with improvement in two of the measures. However, these findings, while promising, are not definitively caused by the intervention. There was a staggered roll out of the intervention in 2013 well into 2014; different schedules for the introduction of model components across facilities; and finally, unusually high patient acuity levels in some ECCP facilities, all of which make it difficult to state with certainty that the changes observed in the quantitative analysis were due to the intervention. Conclusions may become clearer when data for a full year in which the Initiative has been implemented is available.

SECTION 5 DISCUSSION

The findings in *Section 4* have been presented state by state with state-specific context. The general finding is that there were instances of statistically significant changes in the differences between the ECCP and comparison groups, but they were not consistent within and across the ECCPs. The site visits, phone interviews and web-based survey were very valuable in giving a sense of the hard work the ECCPs engaged in and the challenges they faced in implementing the interventions. We have concentrated on the challenges because they have thus far limited the results. The first Initiative year was designed to be a phase-in period, which, by itself, would limit the observed effectiveness. The phase-in was by groups of facilities and intervention components. The facility phase-in schedule and the type and order of the rollout for individual intervention components varied across the ECCPs and continued through the second year of the Initiative. Moreover, within one ECCP, the implementation of individual components varied across participating facilities. There were other obstacles that were faced to varying degrees across the Initiative. There were challenges in ECCP staffing and facility leadership buy-in and changes in personnel at the ECCPs and the facilities. Geographic dispersion of facilities presented problems in rural areas for hiring and keeping ECCP in-facility staff. (Even in New York the more distant cluster of facilities presented this problem.)

In addition to the status reported for each of the ECCP implementations, other general observations common across the ECCPs include:

- Coverage of patients by APRNs or ECCP RNs during all shifts is not always possible, although there are attempts at having ECCP staff on call in some cases, directly by phone or via telemedicine.
- Consistent implementation of INTERACT tools proved challenging and facilities varied widely in how successful they were in integrating these tools into their daily care routines. In some facilities the tools being used by the Initiative conflict with other mandates, either corporate or from local governments.
- Medication management is mostly done by ECCP consultants and is not well integrated into the facilities.
- There are still physicians practicing in Initiative facilities that resist allowing APRNs to monitor their patients. Some will not accept recommendations to treat sick residents in the facility.
- Families often resist advice not to send the residents to the hospital.
- Data collection and IT implementation has occupied considerable time of ECCP clinical staff, taking away from clinical care in many cases; limited IT infrastructure and lack of computer skills compounded these difficulties.

- At the facility level, staff turnover means training is a time consuming repeated activity. Nurses and CNAs are not yet trained in the tools, such as INTERACT or AMDA, prior to employment. Not all facilities are able to provide refresher training for the Initiative.

Many of the intended interventions of the ECCPs are penetrating facility practices and are well received. The negatives we are pointing out are to provide context for the weak findings thus far. In our site visits and interviews, success stories arise along with reported difficulties. Whether the anecdotes of success become consistent enough to be reflected in the utilization, spending, and quality findings remains to be seen. The next data year, 2014, is still part of the phase-in, but the interventions should be more mature and adapted to the facilities.

There is a potential limitation to detecting improvements in ECCP facilities that is not related to issues of phase-in. RTI is investigating whether there are systematic parallel changes in practice occurring in nonparticipating facilities in each state. If the comparison facilities are introducing some of the intervention components on their own, because of corporate policy or some other private or public initiatives, the perceived effectiveness of this Initiative compared to standard practice would be weaker. Our qualitative findings indicate that some of the interventions were indeed adopted in nonparticipating facilities. Given the difficulties observed in implementing the CMS-sponsored Initiative, with its comprehensive set of components, we doubt that introducing some new tools in some of the comparison facilities will mask the effectiveness of the Initiative, although more intensive approaches might.

APPENDIX A: SUMMARY OF INITIATIVE IMPLEMENTATION BY ECCP

A.1 Alabama Quality Assurance Foundation (AQAF), Alabama (a QIO)

The AQAF Nursing Facility Initiative (Initiative) is operating in 23 nursing facilities in central and north-central Alabama. AQAF leadership has trained registered nurse (RN) Care Pathways Coaches (Coaches) in long-term care and placed them in partner nursing facilities to effect procedural change to existing facility practices. Coaches do not provide direct care, instead they improve staff education and processes through the use of INTERACT III (Interventions to Reduce Acute Care Transfers) tools, Advancing Excellence in America's Nursing Homes tools, Hand-in-Hand dementia training, consistent assignment of staff, staff development training, advance care planning, and creation of Quality Assurance/Performance Improvement (QAPI) and Care Pathways teams to conduct root cause analyses and other quality measures toward reducing hospitalizations. In addition, pharmacy partners are working with Coaches to conduct medication review within all facilities and provide recommendations for improving medication management.

A.2 Indiana University (IU), Optimizing Patient Transfers, Impacting Medical Quality, and Improving Symptoms: Transforming Institutional Care (OPTIMISTIC)

Indiana University's OPTIMISTIC project places highly trained RNs in each facility (19 facilities in total) to provide direct clinical support, education, and training to nursing facility staff; six advanced practice nurses support the OPTIMISTIC RN and provide urgent evaluation and care needs. OPTIMISTIC uses a suite of tools (American Medical Directors Association [AMDA], INTERACT, and their own) and methods to improve medical care, palliative care, and transitional care. Registered nurses (RNs) and nurse practitioners (NPs) conduct a Comprehensive Care Review of each resident in which diagnoses, hospitalization history, medications, activities of daily living, quality of life, plan of care, advance care plan, resident's and family's concerns, and so forth are reviewed by IU geriatricians whose recommendations are conveyed by the ECCP NP to the resident's physician.

A.3 University of Missouri, Sinclair School of Nursing Missouri Quality Initiative for Nursing Homes (MOQI)

Administered through the Sinclair School of Nursing at the University of Missouri, the Missouri Quality Initiative for Nursing Homes (MOQI) is designed to reduce rates of avoidable hospitalizations and readmissions, improve health outcomes and transitions between hospitals and nursing facilities, and reduce health care costs through (1) implementation of INTERACT III tools and processes in 16 nursing facilities and with associated hospitals; (2) placement of a full-time APRN in each nursing facility to provide direct services, coaching, education, and mentoring to facility staff; and (3) development of electronic medical records (EMR) and information technology (IT) connections between nursing facilities and hospitals and providing Surface tablets for the APRNs. The MOQI leadership team is composed of nursing, medical, social work, IT, and data management professionals, and the model is based upon the team's experience in the Quality Improvement Program for Missouri (QIPMO) and long-term care research experience. The team specifically targeted nursing facilities with good nursing quality

and survey ratings and high hospitalization rates and those who work with hospitals with high readmission rates.

A.4 Nebraska Alegent Health Program (Alegent + Creighton) (hospital & health care network)

Alegent + Creighton Health began ECCP activities in 15 nursing facilities in Omaha and the surrounding area. Alegent + Creighton assembled a team of six NPs, who each are assigned to several nursing facilities. NPs provide clinical services to residents in their assigned facilities and also facilitate training among facility staff. Services that they provide include: life issue reviews, medication review using the Long Term Care Medication Outcome Monitor (LTC-MOM) tool, history and physical assessment (H&P) exams, and guidance in using INTERACT III tools. In addition to the NPs, the ECCP also provides dental and pharmacy support to participating facilities through a dental hygienist, dentist, and pharmacist that are part of the ECCP team. The dental hygienist also provides assessments and cleanings for participating residents.

A.5 HealthInsight Nevada Admissions and Transitions Optimization Program (ATOP)

ATOP operated in 25 facilities in 2013. The facilities are divided into groups called “pods.” One APRN and two RNs provide direct clinical support, training, and education to four to five nursing facilities constituting each pod. HealthInsight aims to improve care and reduce avoidable hospitalizations by a “rapid response team” to address changes in conditions identified by using INTERACT and modified-INTERACT tools. The Resident Registry, with information entered by ECCP RNs, captures all relevant clinical data and is designed to provide (1) a risk assessment for each resident’s plan of care; (2) web-based data sharing of resident reports for ECCP staff; (3) targeted queries as needed (e.g., for medication reviews); and (4) “scorecard” reports to nursing facilities and CMS reporting requirements.

A.6 New York Reducing Avoidable Hospitalizations (NY-RAH) Project of Greater New York Hospital Association (GNYHA) Foundation

The Greater New York Hospital Association (GNYHA) Foundation and its partner organizations are implementing a project known as New York Reducing Avoidable Hospitalizations (NY-RAH). NY-RAH places 27 RN Care Coordinators (RNCCs) at 30 nursing facilities in New York City and Long Island, New York. Most of these facilities serve a frail elderly population, but a few serve specialty populations, such as residents with HIV/AIDS and Huntington's disease.

The project’s goals are to (1) reduce avoidable hospitalizations from nursing facilities, (2) improve transitions between nursing facilities and hospitals, and (3) improve palliative care provided to nursing facility residents. To achieve these goals, NY-RAH use RNCCs working in nursing facilities to identify areas needing improvement and to implement initiatives to address them.

The RNCCs do not provide direct clinical care to residents but focus on increasing each facility’s capacity to identify root causes for potentially avoidable hospitalizations and review and modify its policies and procedures to prevent such hospitalizations. They also focus on

developing or modifying policies and procedures to improve transitions and ensuring that all residents have the opportunity to engage in advance care planning and receive palliative care when desired. The RNCCs also help to facilitate the implementation of electronic solutions to improve unavoidable transitions to the hospital and back to the nursing facility.

A.7 University of Pittsburgh Medical Center (UPMC) Community Provider Services Program to Reduce Avoidable Hospitalizations using Evidence-based Interventions for Nursing Facilities (UPMC-RAVEN)

The UPMC-RAVEN (Reduce Avoidable hospitalizations using Evidence-based interventions for Nursing facilities) Initiative operates in 19 nursing facilities in western Pennsylvania. An important focus is the hands-on care provided by UPMC-RAVEN NPs in the facilities. UPMC-based RAVEN leadership has trained enhanced care NPs and RNs in geriatric/palliative care and has placed them in partner nursing facilities. These NPs work together with Pharmacist partners to provide medication management and with educational partners to provide individualized learning plans for training in each facility. INTERACT tools, including SBAR (Situation, Background, Assessment, and Recommendation) and Stop and Watch, are used for early warning and condition monitoring, and the Pennsylvania Physician Orders for End of Life Treatment (POLST) form is used for advance care planning. Telemedicine carts are also being introduced to each facility, allowing on-call ECCP NPs to assist in the diagnosis and treatment of acute changes in condition and other medical emergencies occurring off hours.

A.8 Activities Common to All the ECCPs

All ECCPs participate in a CMS Learning Community led by CMS's operations support contractor, Deloitte Consulting, LLP (Deloitte). The operations support contractor is also responsible for certain day-to-day monitoring tasks for the Initiative. The Learning Community component is intended to disseminate information, best practices, and lessons learned rapidly across ECCPs to facilitate rapid-cycle learning.

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APPENDIX B: SUMMARY OF ANALYTICAL METHODS

B.1 Quantitative Analyses

A regression-based model is used to test quantitative effects of the ECCP interventions. This model provides the general framework for the evaluation of all outcome measures. Most outcome variables are defined at the resident level. They fall into the following broad categories: service utilization, including hospitalizations (overall and those potentially avoidable) and emergency department (ED) visits or observation stays (overall and those potentially avoidable); Medicare or Medicaid expenditures; and quality of care, health, and functional outcomes. All utilization- and expenditure-related outcomes are defined using Medicare or Medicaid claims. In this current report, only Medicare utilization and expenditures are analyzed and reported. Analyses of state-provided Medicaid data are underway and will be added in future reports once available.

The general regression model follows a difference-in-difference design with multiple annual observation periods both before the intervention (2011 and 2012, as the Baseline Years) and periodically after (2013 and onward). The model includes variables for being in the intervention (ECCP) or comparison group during the Baseline Years and for being in those groups for each year in the analysis. It also factors in variables characterizing the residents and their facilities, which are predictive of the outcome variables.

Quantitative evaluation analyses in this report provide results from risk-adjusted, multivariate regression models to estimate the effect of each ECCP intervention, relative to a matched comparison group of facilities, on a range of resident-level outcomes, including markers of quality of care, health, and functional outcomes; utilization of Medicare-covered services; and Medicare expenditures. This report covers a 3-year period from 2011 to 2013. Data for 2011 and 2012 are both pre-initiative years. The baseline year in these regressions is 2011 to compare evaluation outcomes in 2013 during which the Initiative phased in. The data for subsequent years will be added in future annual reports. It is important to note that ECCP-participating facilities implemented the Initiative at different rates throughout 2013 depending on their go-live dates and the extent to which the new ECCP protocols were developed and followed. Since 2013 is the first year of the Initiative, and is a phase-in period, we would anticipate limited impact of ECCP intervention on most of the outcome measures being evaluated.

RTI used the definition of potentially avoidable hospitalizations as developed by Walsh et al.¹ in their study of high-cost dually eligible populations. Since this publication, a few conditions were added or deleted based on subject matter expert input. **Appendix C** provides the list of potentially avoidable hospitalization conditions by conceptual category. The list was

¹ Walsh, E.G., Freiman, M., Haber, S., Bragg, A., Ouslander, J., and Wiener, J.M. Cost drivers for dually eligible beneficiaries: Potentially avoidable hospitalizations from nursing facility, skilled nursing facility, and home and community-based services waiver programs. Report prepared for Centers for Medicare & Medicaid Services, August 2010. Available at: <http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Reports/downloads/costdriverstask2.pdf>

operationalized using ICD-9 codes clustered into the Hierarchical Condition Categories used by CMS in risk adjustment models. The codes are updated as they change over time.

For multivariate regression analyses, we define a series of dichotomous variables (1/0) to indicate whether a resident experienced each of the following events over her/his Initiative-related period annually: (1) at least one hospitalization (all cause), (2) at least one potentially avoidable hospitalization, (3) at least one outpatient ED visit (that did not result in inpatient admission), and (4) at least one potentially avoidable outpatient ED visit. We use the same set of conditions and diagnosis codes in defining potentially avoidable hospitalizations to identify ED visits that are potentially avoidable.

Each observation in the multivariate data contains a set of characteristics of a resident eligible in the analysis year and facility characteristics. The variables are the person's risk factors for having an event during the year and are described in more detail below. The dependent variable for the observation has a value of 1 if at least one tracked event occurred in the year. We are focused on the probability of an event, not the number that may have occurred. To account for the occurrence of multiple events, we create summary measures for utilization rates, expressed as the total number of events of a given type per 1,000 person days. It should be noted that these rates are aggregated to the ECCP or comparison group level, where the numerator is the total number of events and the denominator is the sum of Initiative-related exposure days (in thousands) over all individuals in each group.

For expenditures, we calculate total Medicare payments for each person by summing Medicare paid amounts over all types of Medicare claims with service dates that fall within that person's Initiative-related exposure period during each calendar year. In this total, we count all Medicare payment amounts for all services included in the following types of Medicare claims: inpatient, outpatient (institutional), skilled nursing facility (SNF), hospice, home health, durable medical equipment, carrier file services (i.e., Part B services such as Physician and laboratory that are submitted as noninstitutional claims), and total payments for Part D drugs.

The logic for selecting MDS assessments for quality outcome measurement is consistent with that used by CMS to calculate the nursing facility quality measures for the long-stay residents posted on Nursing Home Compare for public reporting.

To control for confounding factors, our models include resident- and facility-level covariates that are predictive of hospital use and nursing facility quality of care. Selected resident-level covariates include demographic characteristics and case-mix adjusters, such as clinical diagnoses from the MDS and comorbidities derived from Medicare claims as clustered by the CMS Hierarchical Condition Categories (HCCs). Facility-level variables pertain to staffing, ownership, payer mix (percentage of Medicaid residents and percentage of Medicare residents), percentage of residents with advance directives, and availability of an Alzheimer's special care unit.

The comparison groups in each state were established through propensity score matching. Propensity scores summarizing facility characteristics were generated through logistic regression and assigned to each facility, and then Initiative facilities were each matched with two non-Initiative facilities with similar propensity scores. Analysis of facility statistics shows that this

propensity score matching method produced comparison groups similar in facility-level characteristics to the Initiative facilities. Further analysis of the residents in the Initiative and matched comparison groups showed that resident characteristics were similar enough between the two groups that resident-level matching was unnecessary.

For the analyses in this report the main predictors of interest in the model include a variable (ECCP = 1 or 0) for whether an individual resides in an ECCP facility in each year, two similar indicator calendar year variables (YR12 and YR13, with 2011 as the reference year), and interactions between the ECCP variables and the data years. The *net* ECCP intervention effect in the first Initiative year, 2013, is estimated by the coefficient for the interaction term ECCP*YR13, which captures the difference-in-differences in a given outcome between the ECCP and comparison groups in 2013, accounting for the base year difference in 2011. If there is an intervention effect, we would expect to see a negative and significant coefficient for this interaction, indicating a greater reduction (or slower increase) in an adverse outcome event in the ECCP group than in the comparison group. This interpretation holds for outcomes of utilization and spending as well as adverse quality outcomes. The dependent variables for utilization are set to 1 or 0, depending on whether a medical event has occurred. The models are structured as logits, estimating odds or probabilities of events. Spending is treated as a continuous variable, estimated in logarithmic form. The quality outcomes are derived from the MDS assessments, and for the most part are based on the proportion of assessments observed for a resident during the year indicating the presence of an adverse outcome. A log link function and binomial probability distribution were used for these equations.

B.2 Qualitative Analyses

The qualitative studies are described in detail in *Section 3* of the full Second Annual Report. This report provides primary data analyses using data obtained from Deloitte Consulting (the CMS monitoring contractor), the seven ECCPs, and 146 participating nursing facilities. Formal site visit protocols and telephone surveys are used to ensure standardized primary data are collected. The primary data complement secondary data analyses, providing critical context to inform evaluation findings. In addition to aiding in interpretation of secondary data analyses, our primary data analyses: (1) provide a better understanding of the ECCPs and nursing facilities processes related to implementing various models for the Initiative; (2) allow us to assess the fidelity to the ECCPs' original Initiative design; and (3) gather necessary information to describe the implementation barriers. Our primary data collection and analytic activities are organized by four key conceptual domains: (1) Care Model Description; (2) Learning Community Activities; (3) Program Impact, Consequences, and Spillover Effect; and (4) Program Attrition.

B.2.1 Site Visits and Phone Interviews

All first and second year site visits were staffed jointly by RTI and the Long Term Care Institute (LTCI). Nursing facility site visit selection was based on a purposive selection of different characteristics to ensure the final sample represented the range of participating facilities. The facility characteristics were varied and included size, quality ratings, profit and chain status, as well as rural versus urban location. We excluded facilities that were potentially due for a survey by looking for a most recent survey date. We approached facility selection differently each year. In 2013, because of the staggered cohort implementation of the Initiative,

facility selection was restricted to only those facilities where the Initiative was implemented for 90 days or more. All first year site visits were completed by September 1, 2013. For 2014, the team selected one or two facilities for revisit and two or three facilities that had not been visited in 2013. All 2014 site visits were completed by July 1, 2014. In both years, each site visit lasted 5 business days and included two parts: (1) an *ECCP component*, which included a visit and interviews with key ECCP leadership and other staff, and (2) a *facility component*, which included a visit to four participating facilities.

Facility-level telephone interviews were conducted with facility staff that were deemed most appropriate by RTI ECCP leads after site visits were completed. For 2013, 99 telephone interviews, and for 2014, 101 telephone interviews with participating facilities in all seven ECCPs were completed. Telephone interviews were conducted following a shortened interview guide touching on the main domains covered in the site visit interviews. High-level notes were taken in each call to capture the findings and then these were coded for analysis with NVivo qualitative data analysis software.

We also have developed a protocol for facilities who have withdrawn from the Initiative. There were no exit interviews to conduct in 2013. One exit interview was conducted by phone in 2014.

Both in-person and phone discussions are conducted according to standard qualitative evaluation practice, guaranteeing respondents anonymity and confidentiality to the extent possible to maximize the quality of the information obtained and to maintain the evaluative nature of the study. All respondents received a one-page summary of the main project activities and a one-page confidentiality statement. All interview materials were approved by the RTI Institutional Review Board (IRB).

B.2.2 Web-based Survey of Nursing Facility Administrators in Participating Facilities

RTI is administering surveys annually in four waves (one per year in Years 1 through 4) via a web-based application. The survey instrument and the data collection are designed and managed by the RTI evaluation team in collaboration with RTI's Survey Research Division and Research Computing Division in close consultation with CMS. RTI is responsible for collecting, processing, and analyzing all survey data. The survey and data collection procedures were approved by RTI's IRB. Wave 1 data collection ran from August 5, 2013 to February 5, 2014, for a total data collection period of roughly 6 months (because of staggered implantations of the Initiative by participating facilities). Wave 2 data collection ran from August 5, 2014 to September 3, 2014.

RTI designed the survey instrument specifically for the evaluation of this Initiative. The aim of the instrument is to obtain information from the Nursing Facility Administrator or another designated facility contact in management about their implementation and to capture facility information. The survey instrument covers several key and broad domains, including questions on facility capabilities, implementation successes and challenges, care model description, implementation progress, and it solicits feedback on the questionnaire for future use. The survey length is approximately 20 to 30 minutes.

APPENDIX C: POTENTIALLY AVOIDABLE HOSPITALIZATIONS

The following table is the conceptual basis for the list of diagnosis codes used to identify potentially avoidable hospitalizations and emergency department visits. The technical expert panels referred to in the notes are those for the Walsh et al. (2012) study that is the basis of the diagnoses used in the Initiative evaluation. The extensive lists of ICD-9 codes used to operationalize the categories of conditions are available in the full Annual Reports.

Table C.1
Conditions defined as potentially avoidable hospitalizations in nursing facilities
(Excerpt of Table 1 from Walsh et al., 2012)

Diagnostic Condition	Preventable/Manageable in Nursing Facility	Rationale
Anemia	N/Y	Anemia should be identified, followed, and managed proactively. Bone marrow failure may require periodic transfusions, which generally do not require inpatient admission, except in some clinically complex patients. The frequent need for transfusions is a poor prognostic sign, and these patients should be considered for palliative care or hospice as an alternative to hospitalization.
CHF	Y/Y	Many episodes of exacerbations of CHF (not new onset or with hemodynamic instability) can be managed in a NF, and many can be prevented if patients at risk are monitored carefully. There are cases of frequent CHF exacerbation despite good management—this is a very poor prognostic sign, and these patients should be considered for palliative care or hospice as an alternative to hospitalization.
Hyper- and hypotension: separate conditions	Y/Y	Hypertension is often over-treated in long-term care patients. Hypertensive episodes are often related to agitation or discomfort, not a primary cardiovascular condition. Iatrogenic hypotension and postural hypotension are common due to polypharmacy with medications that can affect blood pressure and/or volume depletion related to diuretic use or poor fluid intake, and could be prevented.

(continued)

Table C.1 (continued)
Conditions defined as potentially avoidable hospitalizations in nursing facilities
(Excerpt of Table 1 from Walsh et al., 2012)

Diagnostic Condition	Preventable/Manageable in Nursing Facility	Rationale
Hyper- and hypoglycemia: diabetes mellitus with ketoacidosis or hyperosmolar coma	Y/Y	Diabetes is often over-treated in long-term care patients. Patients should be monitored at appropriate frequencies, and hypoglycemic medications adjusted to keep blood sugar in a broad range in most patients. Over-aggressive treatment can result in frequent and unnecessary episodes of hypoglycemia.
Dehydration acute renal failure hypokalemia hyponatremia	Y/Y	Acute renal failure is often the code used for patients who are dehydrated. Patients at risk should be monitored and treated for these conditions before they are severe enough to require acute care transfer.
Constipation or fecal impaction obstipation	Y/Y	Bowel habits should be routinely monitored and appropriate dietary, nonpharmacologic, and pharmacologic interventions implemented. Patients should not become so severely constipated they require acute care transfer.
Diarrhea	N/Y	Acute, severe diarrhea due to gastroenteritis or food poisoning may require hospitalization, but can often be managed in the NF. (See below under C. difficile).
Clostridium difficile	??	The most common cause of diarrhea in this population is now C. difficile, which commonly results from the inappropriate and unnecessary use of antibiotics, and may be preventable in some cases.
Gastroenteritis with nausea and vomiting	N/Y	Acute, severe gastroenteritis or food poisoning may require hospitalization for hydration, but can often be managed in the NF setting.
Cellulitis	?/Y	Most cases of cellulitis can be managed in a NF.
Skin ulcers including pressure ulcers	Y/Y	Pressure ulcers can often be prevented, and existing ulcers should be treated and monitored so that they do not become severe enough to require hospitalization.
Lower respiratory: Pneumonia Bronchitis	?/Y	Early identification and treatment have been shown to prevent many hospitalizations. Patients who meet specific severity of illness criteria may require hospitalization.

(continued)

Table C.1 (continued)
Conditions defined as potentially avoidable hospitalizations in nursing facilities
(Excerpt of Table 1 from Walsh et al., 2012)

Diagnostic Condition	Preventable/Manageable in Nursing Facility	Rationale
UTI	Y/Y	UTI is probably the most over-diagnosed and inappropriately treated acute condition in the long-term care population. Most cases of true UTI can be managed without hospitalization.
Falls and Trauma	Y/?	Most of these conditions relate to injurious falls. Many but not all falls can be prevented. Patients who meet specific criteria may require evaluation in an emergency room, and some require admission.
Altered mental status/acute confusion/delirium	Y/?	Initial assessment can be done in a NF unless there are unstable vital signs. Depending on the underlying condition, delirium often can be managed without hospitalization in the NF.
Psychosis, severe agitation Organic brain syndrome	N/Y	Patients with dementia and psychotic disorders should be managed with nonpharmacologic and pharmacologic treatment and followed carefully. Geropsychiatrists, psychologists, and trained mental health nurses can help with follow-up. Appropriate medical evaluation should be done for acute changes. Hospitalization is only necessary if the patient is a danger to herself or others.
COPD Asthma Chronic bronchitis	Y/Y	These diagnoses are often used interchangeably in long-term care patients. Many episodes of exacerbations of COPD (not with severe bronchospasm, hypoxia, or hemodynamic instability) can be managed in the facility, and many can be prevented if patients at risk are monitored carefully. Frequent COPD exacerbation despite good management is a very poor prognostic sign, and these patients should be considered for palliative care or hospice as an alternative to hospitalization.
Weight loss, nutritional deficiencies, adult failure to thrive	Y/?	Weight should be monitored regularly and significant weight loss evaluated and managed before it becomes severe enough to require hospitalization.

(continued)

Table C.1 (continued)
Conditions defined as potentially avoidable hospitalizations in nursing facilities
(Excerpt of Table 1 from Walsh et al., 2012)

Diagnostic Condition	Preventable/Manageable in Nursing Facility	Rationale
Seizures	Y/Y	Close follow-up and careful management of anticonvulsant medications can often prevent recurrent seizures. Not all patients who have had a seizure need to be transferred if they have a known cause of seizures.

NOTES: The letter before the slash indicates whether the Technical Expert Panel (TEP) agreed that condition could have been prevented or prevented from becoming serious enough to warrant hospitalization; the letter after the slash indicates whether the TEP agreed that, if the condition occurred, it could safely be managed without hospitalization in many cases. The TEP's determinations were made with the underlying premise that some but not all of the hospitalizations for these conditions could be prevented (see text).

Y = yes; N = no; ? = (TEP) was uncertain about rating; CHF = congestive heart failure; UTI = urinary tract infection; COPD = chronic obstructive pulmonary disease; NF = nursing facility.

SOURCE: Walsh, E. G., Wiener, J. M., Haber, S., Bragg, A., Freiman, M., and Ouslander, J. G. (2012). Potentially avoidable hospitalizations of dually eligible Medicare and Medicaid beneficiaries from nursing facility and home- and community-based services waiver programs. *Journal of the American Geriatrics Society*, 60(5), 821–829.

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APPENDIX D: DESCRIPTIVE STATISTICS

Table D.1
Medicare utilization: Annual percentage of residents who experienced each type of event in 2012

Event	AL ECCP	AL Comp	IN ECCP	IN Comp	MO ECCP	MO Comp	NE ECCP	NE Comp	NV ECCP	NV Comp	NY ECCP	NY Comp	PA ECCP	PA Comp
Any hospitalization (all cause)	34	33	28.6	27.8	34.7	30.1	30.9	27.3	29.2	30.9	32.8	31	32	30.2
Any potentially avoidable hosp.	17.3	17.2	13.7	13.6	19	15.1	15.6	14.9	12.6	14.2	14.1	13.3	15.9	14.7
Any hospitalization in CAHs (all cause)	0	0	0	1	0	1.8	0.4	3	1	2.4	0	0	1.6	0.4
Any potentially avoidable hosp. in CAHs	0	0	0	0.5	0	1.2	0.2	2.3	0.8	1.7	0	0	1.2	0.3
Any ED visit (all cause)	27.3	24.1	19.1	23.3	23.7	24.4	23.7	25.1	17.9	17.6	15.6	15	22.6	21.9
Any potentially avoidable ED visit	10	9.2	6.9	7.8	8.6	9.3	8.1	8.8	6.2	5.9	4.9	4.6	8.7	7
Any observation stay	3.4	2.9	2	3.3	3.9	3.5	2.2	4.4	3	4.3	0.3	0.3	3.8	3.1
Any potentially avoidable obs. stay	1.2	1	0.5	0.9	1.5	1.1	0.5	1.3	0.7	1.3	0.1	0.1	1.3	0.6
Any ED visit or obs. stay	27.7	24.3	19.3	23.8	23.8	24.6	23.8	25.6	18.1	17.8	15.6	15	22.9	22.1
Any potentially avoidable ED visit or obs. stay	10.4	9.4	6.9	8.1	8.7	9.3	8.1	9	6.3	5.9	4.9	4.6	8.7	7.1
N (Residents)	3,583	7,152	2,970	5,658	2,320	4,589	1,594	3,375	3,902	2,091	7,928	12,927	2,721	6,228

NOTES: ECCP = Enhanced Care and Coordination Providers; Comp = comparison group facilities; CAH = Critical Access Hospital; Obs. stay = outpatient observation stay; ED = emergency department.

Table D.2
Medicare expenditure (in dollars) per beneficiary: Means (standard deviations) in 2012

Category	AL ECCP	AL Comp	IN ECCP	IN Comp	MO ECCP	MO Comp	NE ECCP	NE Comp	NV ECCP	NV Comp	NY ECCP	NY Comp	PA ECCP	PA Comp
Total Medicare payments	20,533 (20,620)	19,895 (20,249)	24,472 (24,874)	21,523 (22,828)	21,555 (23,789)	20,339 (21,089)	21,403 (23,242)	17,982 (19,876)	24,057 (24,508)	23,083 (27,364)	28,271 (36,437)	25,869 (33,793)	22,417 (23,288)	21,949 (22,558)
All-cause hospitalizations	4,329 (9,338)	4,299 (9,361)	4,847 (11,986)	3,853 (9,567)	5,596 (13,859)	4,027 (10,228)	4,708 (10,942)	3,685 (9,067)	5,614 (13,744)	6,052 (15,577)	9,654 (23,983)	8,667 (21,933)	4,951 (11,924)	4,490 (10,473)
Potentially avoidable hosps.	1,539 (4,544)	1,601 (4,682)	1,675 (5,674)	1,329 (4,624)	1,881 (5,115)	1,455 (5,091)	1,593 (4,877)	1,361 (4,075)	1,609 (5,825)	1,578 (5,306)	2,476 (8,552)	2,157 (7,936)	1,792 (6,535)	1,480 (4,621)
All institutional outpatient services	1,922 (4,085)	1,599 (3,655)	3,052 (5,009)	2,764 (4,641)	2,000 (4,413)	2,091 (4,111)	2,407 (4,684)	2,073 (4,471)	1,460 (3,578)	1,630 (4,166)	1,522 (4,203)	1,472 (4,390)	3,193 (4,955)	2,908 (4,551)
All-cause ED visits	178 (448)	148 (371)	124 (360)	165 (447)	160 (405)	187 (487)	155 (441)	226 (646)	146 (476)	202 (710)	104 (352)	92 (309)	158 (409)	172 (512)
Potentially avoidable ED visits	54 (205)	48 (194)	39 (174)	45 (192)	48 (189)	60 (237)	45 (213)	74 (365)	42 (215)	66 (358)	32 (178)	25 (135)	52 (210)	47 (245)
All observation stays	40 (324)	34 (243)	29 (252)	61 (630)	51 (279)	51 (327)	29 (225)	67 (400)	55 (435)	95 (533)	3 (71)	6 (128)	54 (566)	43 (290)
Potentially avoidable obs. stays	12 (120)	12 (127)	7 (96)	10 (121)	15 (127)	12 (127)	5 (81)	23 (261)	10 (123)	27 (270)	1 (44)	1 (40)	15 (148)	9 (123)
ED visits and obs. stays combined	187 (494)	154 (401)	127 (373)	194 (744)	166 (426)	195 (531)	158 (448)	239 (679)	156 (566)	208 (730)	104 (352)	92 (311)	170 (653)	175 (516)
Potentially avoidable ED visits and obs. stays	56 (210)	50 (200)	39 (174)	47 (203)	49 (190)	61 (237)	46 (216)	77 (374)	42 (216)	66 (358)	32 (178)	25 (135)	52 (211)	48 (248)

(continued)

Table D.2 (continued)
Medicare expenditure (in dollars) per beneficiary: Means (standard deviations) in 2012

Category	AL ECCP	AL Comp	IN ECCP	IN Comp	MO ECCP	MO Comp	NE ECCP	NE Comp	NV ECCP	NV Comp	NY ECCP	NY Comp	PA ECCP	PA Comp
SNF services	6,365 (9,569)	6,267 (9,591)	9,714 (13,280)	7,611 (11,720)	5,416 (8,504)	5,481 (9,191)	6,911 (11,183)	4,639 (8,640)	10,194 (13,769)	8,929 (14,540)	8,618 (15,412)	8,146 (13,902)	6,094 (9,955)	6,362 (10,290)
Hospice services	1,660 (6,675)	1,984 (7,567)	1,364 (6,297)	1,710 (7,005)	2,569 (8,164)	3,465 (9,942)	2,093 (7,103)	2,038 (6,800)	1,959 (8,420)	1,599 (7,566)	1,139 (6,209)	691 (4,822)	1,253 (5,697)	1,549 (6,160)
Carrier file services	2,452 (4,782)	2,274 (4,470)	2,582 (5,137)	2,382 (5,130)	2,469 (3,251)	1,911 (2,520)	1,863 (3,021)	1,527 (2,098)	2,451 (3,457)	2,553 (3,342)	3,498 (4,774)	3,634 (5,164)	2,594 (4,578)	2,375 (3,818)
Physician services	1,186 (1,953)	1,214 (2,341)	1,142 (1,542)	1,183 (1,945)	1,483 (2,498)	1,112 (1,737)	1,214 (2,608)	1,019 (1,557)	1,733 (2,817)	1,790 (2,589)	2,405 (3,572)	2,463 (3,832)	1,617 (2,031)	1,441 (1,944)
Durable medical equipment	210 (971)	263 (1,262)	202 (1,290)	193 (1,085)	158 (1,021)	148 (760)	207 (1,079)	253 (2,848)	263 (1,330)	292 (1,238)	398 (1,605)	370 (1,504)	225 (955)	206 (1,185)
Part D prescription drugs	3,564 (5,348)	3,183 (4,573)	2,681 (4,505)	2,986 (4,207)	3,309 (6,252)	3,191 (5,205)	3,181 (5,435)	3,748 (6,636)	2,073 (4,083)	1,987 (3,497)	3,371 (6,714)	2,840 (4,936)	4,094 (6,181)	4,040 (7,060)
N (Residents)	3,489	6,995	2,806	5,526	2,219	4,461	1,529	3,281	3,647	1,933	7,638	12,511	2,651	6,062

NOTES: ECCP = Enhanced Care and Coordination Providers; Comp = comparison group facilities; ED = emergency department; Obs. stays = outpatient observation stays; SNF = skilled nursing facility.

Table D.3
Quality outcomes: Percent of observed MDS assessments with each outcome in 2012

MDS Assessment Item	AL ECCP	AL Comp	IN ECCP	IN Comp	MO ECCP	MO Comp	NE ECCP	NE Comp	NV ECCP	NV Comp	NY ECCP	NY Comp	PA ECCP	PA Comp
Assessed and appropriately given the seasonal flu vaccine	95.0	93.3	80.1	87.0	90.7	91.8	92.8	93.3	78.4	90.1	92.4	94.1	90.9	94.5
Assessed and appropriately given the pneumococcal vaccine	96.7	89.4	86.7	88.4	83.2	91.3	82.6	93.6	82.4	93.5	95.8	96.6	96.1	94.6
Have/had a catheter inserted and left in bladder	3.4	3.1	4.3	4.8	3.0	3.4	5.1	5.9	6.3	8.6	3.4	2.8	4.5	3.9
Were physically restrained	0.6	1.1	0.7	0.5	1.7	0.9	0.5	0.4	1.4	1.8	1.4	1.3	1.8	2.6
Received an antipsychotic medication	25.5	27.3	20.7	20.9	18.6	24.1	20.9	24.9	20.8	23.9	19.2	21.0	24.5	26.9
Experienced one or more falls with injury	11.4	10.9	12.1	12.6	16.5	15.5	10.8	14.0	9.9	9.2	7.9	6.3	12.8	9.9
Self-report moderate to severe pain	6.6	7.1	8.2	8.8	11.5	11.6	13.8	14.6	12.0	13.2	3.8	3.7	12.3	12.0
Pressure ulcers of high-risk residents only ¹	3.7	4.6	5.1	5.6	6.7	6.8	5.2	4.4	6.8	8.9	8.2	7.9	5.9	5.3
Need for help with Activities of Daily Living has increased	13.2	14.0	18.0	18.3	14.2	14.2	16.6	16.1	17.0	18.9	12.6	13.8	18.9	18.7
Urinary tract infection	4.1	4.8	4.2	5.0	7.7	8.5	8.0	7.9	7.8	7.5	4.7	5.4	5.5	5.2

(continued)

Table D.3 (continued)
Quality outcomes: Percent of observed MDS assessments with each outcome in 2012

Measure	AL ECCP	AL Comp	IN ECCP	IN Comp	MO ECCP	MO Comp	NE ECCP	NE Comp	NV ECCP	NV Comp	NY ECCP	NY Comp	PA ECCP	PA Comp
With depressive symptoms	2.3	2.5	4.8	5.4	4.7	6.4	7.1	8.0	4.3	5.1	10.0	13.4	4.9	5.3
Lost control of bowel or bladder of low-risk residents only ²	40.6	39.8	53.3	56.0	36.1	36.8	51.7	42.8	55.1	48.4	43.0	38.5	62.4	56.2
Lost too much weight	6.7	7.8	7.1	7.1	6.3	7.0	6.2	7.3	7.3	6.6	6.8	5.6	7.3	6.4
Receiving hospice care	5.5	6.4	4.2	5.6	8.4	11.5	7.6	8.3	6.3	5.5	3.0	1.9	4.2	5.2
With oral/dental problems ³	13.5	16.4	5.1	7.4	5.7	13.0	17.3	15.8	10.0	14.1	8.7	17.3	15.0	13.3
With swallowing disorder ⁴	4.0	7.3	5.4	5.0	8.7	10.0	10.3	15.8	10.9	6.8	7.5	4.5	12.7	8.1
N (Residents)	3,583	7,172	2,970	5,658	2,320	4,589	1,594	3,375	3,902	2,091	7,928	12,927	2,721	6,228

NOTES: ECCP = Enhanced Care and Coordination Providers; Comp = comparison group facilities; The N reflects total number of long-stay residents in annual analytic samples. Some residents may be excluded from an outcome due to measure exclusions.

¹ High risk is defined as one or more of the following: impaired bed mobility; impaired transfer function; comatose; or malnutrition or at risk of malnutrition.

² Low risk is defined as ALL of the following are absent: severe cognitive impairment; totally dependent in bed mobility; totally dependent in transfer; and totally dependent in locomotion on unit.

³ With oral/dental problems on the last observable MDS assessment.

⁴ With swallowing disorder on at least one observed MDS assessment.