

**Independent Evaluation of the  
Ninth Scope of Work, QIO  
Program: Final Report**

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Volume I: Findings

November 11, 2011

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# CONTENTS

EXECUTIVE SUMMARY .....	ix
I INTRODUCTION .....	1
A. Purpose and Design of the QIO Program.....	2
B. Overview of Evaluation Methods.....	7
1. Qualitative Data from Site Visits and Partner Interviews.....	7
2. Surveys of QIO Staff and of Hospitals and Nursing Homes.....	8
3. Impact Analyses.....	8
C. Organization of the Report.....	11
II QUALITY IMPROVEMENT ENVIRONMENT IN WHICH QIOs OPERATE .....	12
A. Other Organizations Sponsoring Quality Improvement Initiatives.....	12
B. Providers' Support for Improving Quality.....	13
C. Barriers to QI .....	15
1. Hospitals.....	15
2. Nursing Homes .....	16
3. Physician Offices .....	17
III QIO SERVICES PROVIDED AND ENGAGEMENT OF PROVIDERS.....	19
IV QIOS' EXPERIENCES OF THE 9TH SOW CONTRACT AND CMS PROGRAM SUPPORT .....	22
A. Strengths .....	22
B. Potential Problem Areas .....	22
V EFFECTIVENESS OF THE QIO PROGRAM.....	27
A. Hospitals: SCIP/HF.....	30
1. Survey and Site Visit Results .....	30
2. Impact Estimates .....	31
B. Hospitals: Methicillin-Resistant Staphylococcus Aureus (MRSA) .....	37
C. Nursing Home Physical Restraints and Pressure Ulcers.....	37
1. Survey and Site Visit Results .....	37
2. Impact Analyses.....	39

- D. Nursing Homes in Need (NHIN) .....44
  - 1. Survey and Site Visit Results .....44
  - 2. Descriptive Trend Analysis.....46
- E. Drug Safety .....48
  - 1. Survey and Site Visit Results .....48
- F. Prevention Disparities Theme .....49
- G. CKD Theme .....49
  - 1. QIO Partner Discussion and Site Visit Results .....50
  - 2. Impact Estimates .....51
- H. Care Transitions Theme.....53
  - 1. QIO Partner Discussion and Site Visit Results .....53
  - 2. Impact Estimates .....55
- I. Core Prevention Theme .....58
  - 1. Site Visit Results .....58
  - 2. Descriptive Trend Analyses.....58
- VI EFFECTS ON HEALTH CARE DISPARITIES OF HOSPITAL SCIP/HF,  
NURSING HOME, CKD, AND CARE TRANSITIONS THEMES.....60
  - A. Hospitals: SCIP/HF Disparity Results.....60
  - B. Nursing Home Themes Disparity Results.....62
  - C. CKD and Care Transitions Disparity Results.....63
- VII INTERVENTIONS HIGHLY VALUED BY STAKEHOLDERS .....67
  - A. SCIP/HF .....67
  - B. Physical Restraints, Pressure Ulcers, and NHIN.....68
  - C. Drug Safety .....71
  - D. Core Prevention .....72
  - E. Prevention Disparities .....73
  - F. Chronic Kidney Disease.....73
  - G. Care Transitions .....74

VIII SUGGESTIONS FOR PROGRAM IMPROVEMENT.....75

    A. QIOs and the Quality Improvement Landscape.....75

    B. QIO Program Design .....76

    C. QIO Operations and Activities .....78

    D. Measurement of QIOs’ Performance.....78

    E. QIO Program Evaluation .....79

REFERENCES .....80

## TABLES

ES.1	Provider Participation, by Theme .....	xi
ES.2	Impacts from QIO Work Found and Not Found for Measures Subjected to Rigorous Impacts Analysis.....	xiii
ES.3	Size of Impacts for Measures with Documented QIO Impact .....	xiv
I.1	Summary of 9th SOW Themes .....	5
I.2	Surveys Conducted for the Evaluation of the QIO 9th SOW.....	8
II.1	Supportiveness of the Provider Environment: Mean Score (maximum 10)* .....	14
III.1	Types of Services Provided by QIOs .....	20
III.2	Provider Participation, by Theme .....	21
IV.1	Number of Items with 90 Percent or More Favorable Responses, by Topic and Theme .....	23
IV.2	Number of Potential Problem Area Items, by Topic and Theme .....	24
V.1	Analytic Approaches Used to Estimate Impacts for QIO 9th SOW Themes .....	27
V.2	Analysis of Relative Effectiveness of QIO Approaches—Grouping of QIOs by Cluster Analysis of Composite Scores in Collaboration, Individual Activities, and Group Approaches, by Theme .....	28
V.3	SCIP/HF Theme: Change in Targeted Outcomes Between Baseline (July 2007–June 2008) and Followup (June 2009–July 2010) .....	32
V.4	SCIP/HF Theme: Estimated Impacts of QIO Work with PPs on Process-of- Care Outcomes.....	34
V.5	Nursing Home Physical Restraints Theme: Change in Physical Restraint Use Between Baseline and Followup.....	40
V.6	Nursing Home Pressure Ulcer Theme: Change in Pressure Ulcer Prevalence Between Baseline and Followup.....	41
V.7	Nursing Home Physical Restraints and Pressure Ulcer Components: Estimated Impacts of QIOs’ Work with PPs on Physical Restraint and Pressure Ulcer Prevalence .....	42
V.8	Estimated Impacts of QIO Efforts on CKD Quality of Care Scores: Regression-Adjusted Predicted Means at Followup (October 2009– September 2010) (Percentages) .....	51
V.9	Care Transitions Operational Changes .....	54

V.10	Estimated Impacts of QIO Care Transitions Efforts on All-Cause Readmissions: Regression-Adjusted Predicted Means at Followup (July 2009–June 2010) (Percentages).....	56
VI.1	Change in Targeted Outcomes for SCIP/HF Theme Between Baseline (July 2007–June 2008) and Followup (June 2009–July 2010), By Hospitals in High or Low Minority Counties.....	61
VI.2	Estimated Impacts of the SCIP/HF Theme on Process-of-Care Outcomes, by Hospitals Located in High versus Low Minority Counties.....	62
VI.3	Change in Targeted Outcomes for Physical Restraint and Pressure Ulcer Themes Between Baseline (July 2007–June 2008) and Followup (June 2009–July 2010), for Non-white and White Residents.....	63
VI.4	Estimated Impacts of QIOs’ Work with Physical Restraint and Pressure Ulcer PPs, by Race/Ethnicity of Resident.....	63
VI.5	Estimated Impacts of QIO Efforts on CKD Quality of Care Scores for Underserved (Minority) <sup>a</sup> Beneficiaries: Regression-Adjusted Predicted Means at Followup (October 2009–September 2010) (Percentages).....	65
VI.6	Estimated Impacts of QIO Care Transitions Efforts on All-Cause Readmissions for Underserved (Minority) <sup>a</sup> Beneficiaries: Regression-Adjusted Predicted Means at Followup (July 2009–June 2010) (Percentages) .....	66



## FIGURES

ES.1	Baseline and Follow-Up Rates of Physical Restraints for NHINs with Zero, One, and Two, Years of Followup .....	xv
I.1	Conceptual Model of the QIO Program .....	4
I.2	Time Periods of Data Used in Descriptive and Impact Analyses of the QIO 9th SOW Evaluation.....	10
V.1	SCIP/HF Theme: Plot of Average Followup VTE Prevention Composite Outcome Measure, by Pre-SOW Forcing Variable Values .....	33
V.2	Baseline and Followup Rates of Physical Restraints for NHINs with Zero, One, and Two, Years of Followup .....	47

## EXECUTIVE SUMMARY

The Quality Improvement Organization (QIO) Program is operated by the Centers for Medicare & Medicaid Services (CMS) to ensure and improve the quality of health care for Medicare beneficiaries. As required by Sections 1152–1154 of the Social Security Act, CMS contracts with a nationwide network of independent QIOs to help health care providers deliver high quality care to Medicare beneficiaries. The contracts last for three years, with each contract cycle called a scope of work, or SOW. The 9th SOW began on August 1, 2008, and ended July 31, 2011. With a budget of roughly \$1.1 billion for the current SOW, the QIO Program is the single largest investment in quality improvement (QI) infrastructure—public or private—in the nation.

This report presents the results of an independent evaluation of the 9th SOW QIO Program, conducted by Mathematica during 2008–2011 with funding from CMS. During the 9th SOW, the program resulted in documented positive impacts on some aspects of clinical care, and QIO assistance highly valued by health care providers. The evaluation found that QIOs’ work led to improvement in four of the twelve targeted measures of quality that we evaluated. While the remaining eight quality measures may have improved over the period of the 9th SOW, we could not attribute those improvements to QIO efforts. This finding may be partially explained by the many non-QIO quality improvement activities occurring simultaneously in the field. Further, because of its accelerated schedule, this evaluation was not based on the entire period of the 9th SOW. QIO impacts may have increased in the final stages of the 9th SOW. At the same time, more than three-fourths of the hospitals and nursing homes in our national survey with QIO contacts said the contacts themselves or resources provided by the QIO staff led to changes that improved care for their patients. Several suggestions for ways to enhance the program’s effectiveness are provided below.

### A. The 9th SOW QIO Program

To help improve the quality of health care delivered to Medicare beneficiaries, the QIOs provide technical assistance services to physicians, hospitals, and nursing homes that treat or serve Medicare beneficiaries. The 9th SOW focuses on the following areas, called “themes,” which were undertaken in all states except as noted:

- Improving preventive care (*core prevention* theme)
- Improving patient safety (*patient safety* theme). This theme had the following subthemes, which, for simplicity, we also call themes in this report:
  - Improving surgical and heart failure care in hospitals (surgical care improvement project/heart failure or *SCIP/HF* theme)
  - Reducing methicillin-resistant staph aureus in hospitals (*MRSA* theme)
  - Reducing physical restraints in nursing homes (*physical restraints* theme)
  - Reducing pressure ulcers in nursing homes (*pressure ulcers* theme)
  - Assisting troubled nursing homes, selected from those that were placed on the Special Focus Facilities list because of their excessive number of deficiencies (which triggers increased oversight from state regulators) (*nursing homes in need* [NHIN] theme)

- Improving drug safety through partnerships with Medicare Advantage plans, Part D prescription drug plans, and/or Medicare providers and practitioners (*drug safety* theme)
- Reducing hospital readmissions by improving transitions of care between hospital and post-hospital care (*care transitions* theme, in 14 selected communities)
- Improving disparities in diabetes care and preventive services (*prevention disparities* theme, in six selected states)
- Improving testing and care for chronic kidney disease (*CKD theme*, in 11 selected states)
- Protecting beneficiaries from substandard health care, investigating and resolving beneficiary appeals and complaints, and assisting hospitals in reporting quality measures (*beneficiary protection* theme, not covered by this evaluation to avoid duplication of the work of another CMS contractor)

For each theme, the QIO contract specifies a range of services that QIOs should offer, the providers to whom the services should be offered, and the measures by which QIOs' performance will be assessed during the contract. QIO services include group education such as seminars/webinars, learning collaboratives, individual consultation, and providing data feedback reports, tools, and links to other resources. QIOs' requirements for targeting and recruiting providers varied widely from theme to theme. Three themes (pressure ulcers, physical restraints, and SCIP/HF) required QIOs to recruit at least 85 percent of their participating providers from a list of poor performers. Intended to target federal dollars effectively, these requirements often meant that QIOs were working with a very small proportion of providers in the state. Across these three themes, the list of poor performers typically encompassed less than a quarter of providers in a state, often fewer than 10 percent. For other themes, the QIOs were free to recruit more broadly from providers in their states. Table ES.1 shows the level of provider participation for each theme.

## **B. Evaluation Methods**

The evaluation used quantitative and qualitative analyses to assess the impact of the program and to identify effective strategies for achieving program goals. It was not possible to conduct rigorous quantitative impact analysis for 5 of the 10 themes, due to problems with data availability and/or lack of an appropriate comparison group. For 2 of these themes (core prevention and NHIN), we were able to conduct descriptive trend analyses. The quantitative analyses used data prepared by CMS and its contractors. The data cover a baseline year just prior to the start of the 9th SOW, and a follow-up year that includes the most recent data available in time for this analysis and begins about one year after the start of the QIOs' contracts.

For themes where it was possible to select a valid comparison group (SCIP/HF, pressure ulcers, physical restraints, CKD, and care transitions), we applied two highly regarded statistical approaches that have not previously been used in studies of the QIO Program. For themes in which CMS gave each QIO a list of low-performing providers to work with, we used a regression discontinuity approach, estimating program impacts by using a statistical model to compare providers just below the performance cut-off for inclusion on CMS's list to those just above the cut-off. The performance cut-off for inclusion on CMS's list served as the "discontinuity" in the regression discontinuity approach. For care transitions and CKD themes,

**Table ES.1. Provider Participation, by Theme**

Theme <sup>a</sup>	Number of States <sup>b</sup>	Mean Number of Providers Working with QIO Per State (Min.–Max.)	Mean Percent of Originally Included Providers Actively Involved Throughout 9th SOW	Estimated Percentage that Never Participated Very Actively <sup>d</sup>
SCIP/HF (hospitals)	53	13 (1–80)	76	2
MRSA (hospitals)	53	9 (1–59)	81	4
Pressure ulcers (nursing homes)	53	28 (2–124)	71	3
Physical restraints (nursing homes)	53	30 (1–130)	69	4
Core prevention (physician practices)	53	38 (4–171)	78	4
Prevention disparities (physician practices)	6	90 (5–179)	66	6
CKD (physicians, dialysis centers, hospital outpatient departments)	11	157 (5–450)	51	10 <sup>e</sup>
Care transitions (hospitals, nursing homes, and other providers)	14 <sup>c</sup>	43 (13–170)	58	26 <sup>f</sup>

<sup>a</sup>NHIN and drug safety theme data are not presented, as the surveys for those themes did not include a question about participation. QIOs generally worked with one nursing home each year on the NHIN theme.

<sup>b</sup>Includes territories and the District of Columbia.

<sup>c</sup>Communities rather than states.

<sup>d</sup>Mean of percentage reported by the QIO theme leaders, unless otherwise noted.

<sup>e</sup>Estimate from calls made by the evaluation team to listed providers in eight states. Estimate is conservative since only calls that reached the intended participant were included in the denominator.

<sup>f</sup>Estimate from QIO theme leaders' categorization of providers on their lists in eight states. Excludes providers not ranked by the theme leaders.

which targeted entire communities or states, we used a propensity score matching approach, carefully matching treatment regions (and thus providers and patients in those regions benefitting from QIO services) to comparison regions with similar characteristics (and the providers and patients in those regions).

Primary data collection included (1) a survey of QIO directors and theme leaders regarding types of QIO services, environments in which they operate, and their suggestions for program improvements; (2) national survey of hospitals and nursing homes to obtain providers' assessment of the value of various QIO services and understand their internal QI efforts; (3) site visits to eight QIOs and physician practices, nursing homes, hospitals, and community health leaders that each QIO worked with, to learn about the role of the QIO in their quality improvement stories, and (4) semi-structured discussions with a sample of QIO-partnered providers and other collaborators for the CKD and Care Transitions themes in each of eight selected states, to understand quality improvements they undertook and the QIO's role in these. All of the primary data collection occurred during late 2010 and early 2011.

## C. Findings

### 1. The 9th SOW QIO Program improved some aspects of quality of care targeted by the program but failed to make an impact on others.

When subjected to a statistical test of whether the QIO Program was able to make a difference in the quality of health care above and beyond what would have occurred without it, the program passed that test on several measures, but did not show a distinct impact on several others (Table ES.2). We find significant impacts for two of the five hospital measures examined; one of the two nursing home measures; one of the two physician practice measures; and none of the four measures examined for the community-based hospital readmission interventions. The improvements are substantial in size for three of the four measures for which the QIOs demonstrated an impact (see Table ES.3).

It should be noted that a separate, concurrent study by the Colorado Foundation for Medical Care (CFMC) has found favorable impacts on readmission rates from the care transitions theme (Brock and Goroski 2010). However, the results of the CFMC and Mathematica studies cannot be compared because they examined different measures of readmissions and used different approaches to selecting comparison communities. These large differences are described in greater detail in the body of this report (see Chapter V, Section H). In brief, in order to be consistent with other measures produced by CMS, Mathematica and CMS agreed that the current study would use the following: (1) 30-day all-cause risk adjusted readmission rates following index hospitalizations for acute myocardial infarction, heart failure, and pneumonia that have been endorsed by the National Quality Forum and are publicly reported by CMS on the Hospital Compare website; and (2) an empirical propensity score matching method to create a set of comparison counties that matched intervention counties on nearly 30 dimensions. In contrast, CFMC's study (1) developed a new measure of readmissions, unadjusted for risk, in which index hospitalizations for all conditions were included, readmissions were counted both as readmissions and simultaneously as new index admissions, and counts of readmissions were divided by a denominator of all Medicare beneficiaries residing in a county (as opposed to being divided by the number discharged beneficiaries at risk for readmission); and (2) identified potential comparison counties using a weighted mean of arithmetic differences on three dimensions, and allowed the participating QIOs discretion in selecting the final set of comparisons.

In addition to these observed impacts, we conducted additional descriptive analyses of trends in outcomes, which cannot be interpreted as impacts but provide information about the magnitude of the trends and whether they showed improvement. Results of a descriptive analysis were consistent with a QIO impact for the NHIN theme (Figure ES.1), where we observed a pattern of greater reductions in pressure ulcers, physical restraint use, and deficiency scores in nursing homes two years out from having worked with the QIO, compared with those only one year out from working with the QIO or not having worked with the QIO at all. Results of a descriptive analysis for the prevention theme did not provide any evidence for QIO impact, since there were no discernable differences in the trends for the physician practices that worked under this theme and the QIO-selected comparison group (the only comparison group available) (see Volume II, Chapter II, Section C).

**Table ES.2. Impacts from QIO Work Found and Not Found for Measures Subjected to Rigorous Impacts Analysis**

Theme	Impact	No Impact
<b>Hospital Interventions</b>		
SCIP/HF	<p>Surgery patients whose doctor ordered treatments to prevent blood clots after certain types of surgeries and received this treatment at the right time (VTE prevention).</p> <p>Surgery patients who were taking heart drugs called beta-blockers before coming to the hospital and kept on the beta-blockers during the period just before and after their surgery.</p>	<p>Surgery patients given the correct perioperative antibiotic starting and ending at the right time.</p> <p>Surgery patients needing hair removed from surgical area before surgery, having hair removed using recommended methods that do not increase risk of wound infections.</p> <p>Heart failure patients given important heart drugs (ACE inhibitors or ARBs) for left ventricular systolic dysfunction (LVSD).</p>
<b>Nursing Home Interventions</b>		
Physical Restraints	Long-stay nursing home residents with physical restraints. <sup>a</sup>	
Pressure Ulcers		Long-stay nursing home residents with pressure ulcers (bedsores) among.
<b>Physician Practice Interventions</b>		
CKD	Patients with diabetes with testing for urinary microalbumin (which signals early kidney damage).	Patients with CKD with a surgically constructed “AV fistula” at the time they begin hemodialysis. <sup>b</sup>
<b>Community Interventions</b>		
Care Transitions: Community Focus		Patients discharged for each of acute myocardial infarction (AMI), congestive heart failure (CHF), and pneumonia readmitted to the hospital within 30 days for any reason (three measures), or following patients discharged for any of the three conditions with a 30 day readmission (combined single measure).

<sup>a</sup>Restricting nursing home residents’ movement with restraints may help prevent some injuries but it often creates other serious problems including chronic constipation, incontinence, pressure sores, emotional problems, isolation, and loss of ability to walk or perform other activities. Residents may also be harmed trying to escape from restraints or from improperly applied restraints.

<sup>b</sup>If a fistula is not available to the care team for access to the vein when the patient needs hemodialysis, a catheter will be used, which is associated with higher risk of dangerous infections.

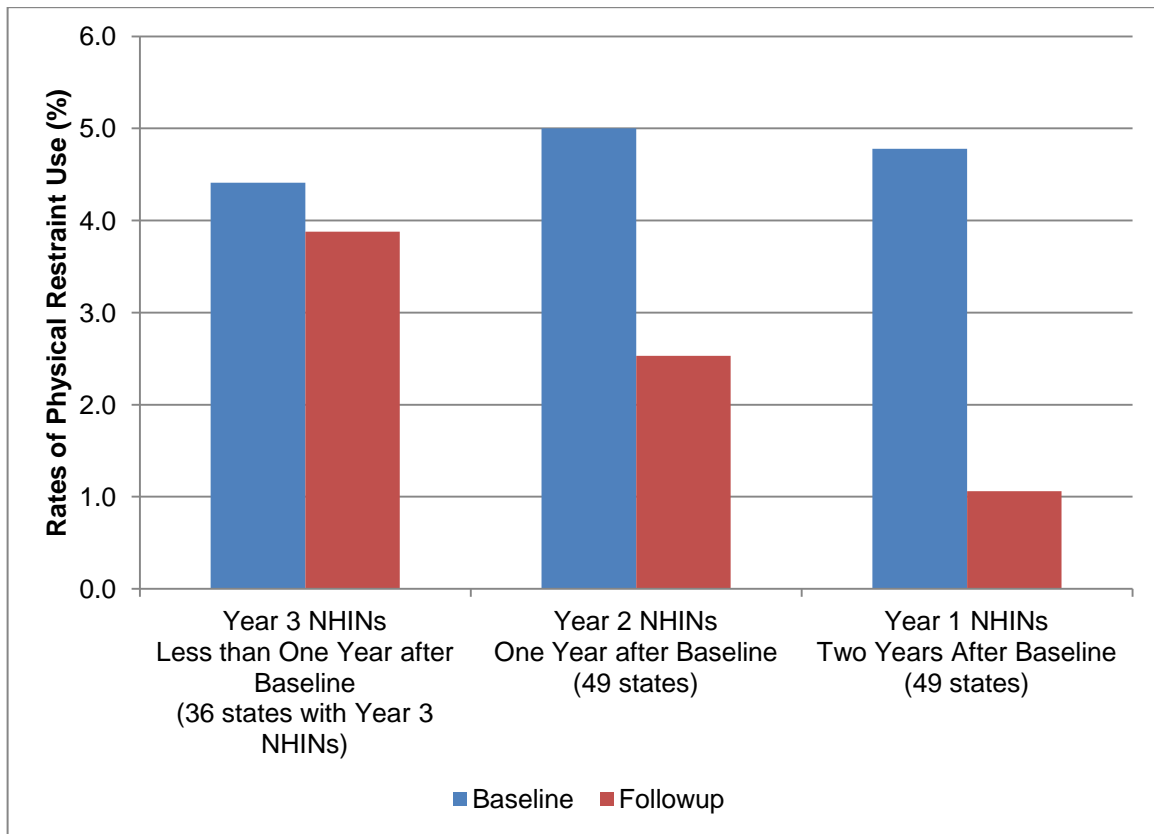
**Table ES.3. Size of Impacts for Measures with Documented QIO Impact**

Theme: Measure	Mean Performance Prior to 9th SOW	Predicted Performance Absent QIO's Work	Additional Percentage Point Change Due to Work with QIO ("Impact")	Reduction in Failure Rate <sup>a</sup>
SCIP/HF: Among surgery patients whose doctor ordered treatments to prevent blood clots after certain types of surgeries, the proportion that received this treatment at the right time (VTE prevention).	80.4	89.2	3.7	34%
SCIP/HF: Among surgery patients taking heart drugs, called beta blockers, before coming to the hospital, the proportion that were kept on beta blockers during the period just before and after surgery.	n.a. <sup>b</sup>	88.2	4.0	36%
Physical Restraints: Percentage of long-stay nursing home residents with physical restraints. <sup>a</sup>	9.6	4.7	2.4	51%
CKD: Among patients with diabetes, the proportion who received a test for urinary microalbumin (which signals early kidney damage).	44.4	43.8	0.6	1%

<sup>a</sup>For measures where higher values are better (the first three measures on this table), the reduction in failure rate—the extent to which the gap between actual and optimal performance was closed—is calculated:  $(\text{Impact}/(100 - \text{predicted value absent QIO's work}) \times 100)$ . For measures where lower values are better (percent of long-stay nursing home residents with physical restraints), the reduction in failure rate is calculated:  $(\text{Impact}/\text{predicted value absent QIO's work} \times 100)$ .

<sup>b</sup>Not available as CMS only started reporting data on this measure in the first quarter of 2009.

**Figure ES.1. Baseline and Follow-Up Rates of Physical Restraints for NHINs with Zero, One, and Two, Years of Followup**



## 2. Health care providers highly valued QIO services and used them to make changes in patient care.

Hospitals, nursing homes, and physician practices that provided information through our surveys and site visits told us they value QIO services. Although one might expect that providers would find certain types of QIO strategies to be more valuable than others, we found a great deal of enthusiasm for the wide range of strategies that the QIOs employed:

- One-on-one assistance to address providers' specific issues was most highly valued by nursing homes and physician practices, though some hospitals also valued such assistance. As one nursing home put it, "Our facility could not get the same thing out of a class. The feeling that you talked to them [the QIO] as a colleague was very important."
- Serving as an information source about quality improvement and government programs and requirements was an important QIO role, particularly for hospitals and physicians.
- Group learning activities were highly valued by care transitions theme partners (including both providers and other health care organizations) and hospitals participating in the SCIP/HF theme.
- Tools provided by the QIO were viewed as very helpful by hospitals, nursing homes, and physicians participating in the CKD theme. As one quality improvement



manager explained, “We are wearing a lot of hats and if there is something out there that is a good practice, it is useful just to pass it along in a form where we can just implement it.”

- Providing and discussing with physicians, hospitals, nursing homes various statistical reports that show the providers’ own data, including graphics and comparative benchmark data, were widely viewed as helpful (“[The data] were motivating,” said one).
- Facilitating the sharing of best practices among organizations was a QIO service frequently cited as key by hospitals and nursing homes.

More important than their reported perceptions of value, more than three-fourths of the QI directors in hospitals and nursing homes in our national survey with QIO contacts said these contacts had led them to make changes in their facility that improved patient care. Most of these respondents further identified improvements in one or more of the specific measures listed in Table ES.2 above, that they believed resulted from the contacts.

- 3. There may be several reasons why the QIO impacts were not larger and more consistent across themes where we could measure impact, including:**
  - a. Other quality improvement resources and activities beyond QIOs exist. Hospitals and nursing homes not working with QIOs may access other resources and consequently end up with similar improvements.**

Public reporting of measures targeted by the QIO Program, and found on the CMS Hospital Compare website, provided a potential motivator during the study period for hospitals to improve their performance on measures targeted by the 9th SOW QIO Program. Also, hospitals were aware that CMS was moving toward value-based purchasing where these measures could count in future payments. In fact, when our surveys asked hospitals whether they had internal efforts in place to improve performance on the targeted measures for the SCIP/HF theme, high proportions of both participants with the QIO theme and nonparticipants had such efforts in place, with little to no difference between the two groups. The hospital survey also found that almost 60 percent of hospitals nationwide were owned by or affiliated with a larger organization that extends an array of QI resources and programs to owned/affiliated organizations, and that apart from corporate initiatives and the QIO, over three-fourths of hospitals were engaged in one or more additional quality initiatives.

The situation for nursing homes is similar, although to a lesser degree. However, unlike hospitals, the proportion of nursing homes with internal efforts in place to improve on targeted measures was much higher for QIO theme participants than nonparticipants. Despite the apparent increase in QI activity among the participating group, we think that internal factors may have inhibited the effects of activities for participants (pressure ulcers participants in particular), as discussed next.

- b. Nursing homes face internal challenges in effectively implementing and sustaining improvements.**

In seven of the eight states we visited, staff in many nursing homes reported that leadership and staff turnover were major barriers to improvement. Turnover at both the managerial and

front-line levels can interrupt relationships and trust that QIOs have built up with facility staff over time, reduce the number of staff trained in QI methods, and ultimately slow or halt ongoing QI projects. In addition, some QIOs' nursing home theme leaders explained that these facilities often lack a "systems" mentality (that is, an understanding that QI requires a systematic, formal approach), so that QI often becomes dependent upon an individual's effort rather than being firmly ingrained in the facility's processes. Like turnover, this lack of institutionalized QI processes would make it difficult to sustain any gains on particular measures. These factors may help explain why participating nursing homes' reported efforts did not lead to demonstrated improvement on the pressure ulcers measure. Reduced use of physical restraints—the nursing home measure that QIOs did effectively influence—may have been an easier target to address and maintain.

**c. The timeframe of the contract may have been too short relative to the goals.**

None of the QIO care transitions theme leaders and few of the CKD theme leaders (nine percent) believed the timeframes for meeting their contractual targets for measure improvement were reasonable (and thus that they could not achieve large, impacts, although they did not state this explicitly). On our site visits, care transitions theme leaders discussed both the challenge and the importance of generating enough trust and understanding among disparate health care providers in the community that had never worked together to achieve common goals. Supporting this, our impact analysis found a small impact on the theme for AMI discharges only for states where the QIO had previously worked with a majority of the participating providers, perhaps due to shorter period needed for building trust and learning to work together.

Whereas QIO theme leaders involved in the care transitions theme focused on improving readmissions for an individual community, and leaders of other themes were asked to focus on improving care within a relatively small target group of providers, those involved in the CKD theme were asked to focus on improving measures statewide. The small magnitude of the effect on microalbuminuria testing and the lack of impact on the AV fistula measure could be due to the ambitiousness of the goal in terms of its statewide nature, relative to the contract timeframe. Consistent with the CKD theme leaders' concerns about timeframes noted above, it is noteworthy that the AV fistula measure did increase more than in comparison practices over the time period examined, as intended, but the difference was not statistically significant. The lack of statistically significant impacts on the AV fistula measure could also be due to the smaller sample sizes for this analysis.

**d. Sufficient data, tools, and resources may not have been available when they were needed.**

Theme leaders for five themes (prevention disparities, core prevention, MRSA, and SCIP/HF, and CKD) often reported tools and resources were not available *when* they were needed. Also, many CKD theme leaders reported not having sufficient data and information to (a) understand the problem the theme is addressing, (b) enable design of an intervention with a high likelihood of success, and (c) identify what interventions have been found to work in other contexts. These factors may have limited the impact the QIOs were able to achieve.

**e. QIOs were evaluated based on all providers the QIOs were expected to work with, not all of whom needed or would use their assistance.**

Some hospitals and nursing homes that we visited did not need or would not use their QIO's assistance, yet they continued to count in the QIO's denominator group of participating providers. In a few cases, the poor performance that had landed them on the target list had dramatically improved by the time the theme work began, and in a few cases hospitals belonging to a system participated in a close-knit community of hospitals within the system and felt the QIO did not add much value. Some QIO staff reported that nursing home leadership turnover essentially prohibited making any progress with some facilities. Yet the QIOs were still measured as though they should have been able to influence care in all these facilities. Although we do not believe the proportion of facilities in QIOs' denominators who did not need or use QIO services is very large (given the survey results noted above), the lack of any effect in these facilities, along with other factors noted above, would lead to a smaller estimated overall effect than QIOs may have had on the subset of active participants alone.

**f. Some QIO activities reached providers not on the QIO's target list, potentially resulting in underestimates of the 9th SOW QIO Program's true impact.**

The measures targeted by the 9th SOW QIO Program often improved for both participating and nonparticipating providers in a particular theme's work. Although a QIOs' work was intended to be closely focused on the participating provider group, we heard numerous examples on our site visits of QIO activities, most commonly QIOs' QI seminars and workshops at regional or statewide conferences, that touched nonparticipating providers as well. In addition, apart from their work in the specific themes described above, QIOs assisted hospitals in submitting target measures as well as others for public reporting so they could receive the highest available annual Medicare payment update. Some hospital staff we visited indicated that QIO staff, upon request, assisted hospitals with improving performance on their measures. Along with the other factors noted above, this may have contributed to the inability to document QIO impacts on some measures.

## **D. Suggestions for Program Improvement**

Mathematica reviewed suggestions by QIO directors for program improvement along with other evaluation data and, combined with our own understanding of the QIO Program in the larger health care context, arrived at suggestions for improvements to five dimensions of the QIO Program:

- QIO Program's position in the QI landscape
- QIO Program design
- QIO operations and activities
- Measurement of QIO performance
- Evaluation of QIO Program as a whole
- QIOs and the QI Landscape

**1. The QIO Program would be more effective if more closely aligned with other CMS and federal programs that address QI, including health reform initiatives.**

CMS could position the QIO Program as the primary technical assistance resource for its many programs, pilots, and demonstrations aimed at improving quality of care. Such an overall alignment may (a) leverage the effectiveness of these initiatives by supplying health care providers with more technical assistance than they are now receiving, and (b) leverage the effectiveness of the QIO Program by combining its technical assistance with the interventions of the programs, pilots, and demonstrations. This concept was independently suggested by several surveyed QIO directors, who recommended that CMS review the interests of other federal agencies and organizations, and coordinate the QIO contract with those efforts (11 percent of responding QIO directors). By aligning the QIO Program with other QI efforts, CMS would reduce the extent to which QIOs and providers are pulled in multiple directions, and in doing so incentivize provider participation.

**2. The QIO Program would be more effective if it reviewed and leveraged existing knowledge of effective methods for technical assistance and rapidly generates new knowledge where needed.**

Our study found that most QIO approaches to technical assistance were valued by providers but there was little effort given to understanding whether some approaches are more effective than others. We heard that QIOs did not necessarily share freely or completely with each other, as would be the case in an optimal national program designed to improve quality of care. Such efforts should take place during the SOW. They should involve the QIOs conducting structured testing of different technical assistance approaches, and involve the QIOs in learning and action collaboratives to benefit from each others' experiences; it is not feasible to simply evaluate which approaches worked after the fact as part of an evaluation, using existing data and recall of key individuals. Because existing literature does not provide enough answers (Paez et al. 2009), CMS could use the QIO Program as a laboratory to test new approaches to rapidly increase uptake of proven quality and safety practices as well as improve the translation and scalability of effective interventions. This new role as QI laboratory would provide immediate and useful knowledge for the Medicare program to improve care for its beneficiaries, and simultaneously generate knowledge that benefits the larger healthcare system.

### **QIO Program Design**

**3. QIOs would be more effective if they were permitted to adapt their services and clinical areas to the specific QI strengths and gaps in their state.**

Staff at several QIOs reported that their effectiveness was constrained by contractual requirements to focus on clinical areas in which providers in the state were already achieving high scores and receiving sufficient assistance from other QI organizations in their state. Increased flexibility could be implemented by requiring each QIO to submit an environmental scan and gap analysis for its state, perhaps as a part of its proposal for a subsequent SOW. CMS and the QIO could establish performance metrics appropriate to the QI gaps the QIO proposes to fill. Alternatively, CMS could establish a menu of focus areas for QIOs consistent with federal priorities and allow the QIOs to select those that overlap with its state's priorities.

**4. QIOs may be more likely to have a measurable impact on quality of care if the period of performance of SOWs were increased to five years.**

Currently, QIOs are expected to bring about measurable change in outcomes within the first 28 months of the SOW because of lags in data availability. A five-year SOW will allow for a longer measurement period, give QIOs more time to bring about changes in the actions of providers, and ultimately improve outcomes measures. Along with an extended timeframe, QIOs should be encouraged to move on from any providers that have reached goals or are unable to use their services, so that each year the QIO's activities are focused on those with whom they are likely to have an impact.

**5. QIOs could be more effective if the QIO Support Center procurement cycle was shifted so that the QIO Support Centers were in full operation when a SOW began.**

Because QIO Support Centers are responsible for efficiently producing necessary tools and information to support the SOW, this suggestion addresses the problem that QIO theme leaders reported—that is, the tools and materials that QIOs needed were often not available when they were needed. This delay likely slowed early progress and resulted in duplicative efforts from individual QIOs.

**6. QIOs might be more effective if CMS was able to provide more timely and reliable data for targeting and monitoring interventions.**

All QIOs we visited discussed trouble with the late timing of data, problems caused by errors and associated recalls, and lack of detail within data. As a result, QIOs could not focus their efforts effectively and wasted resources trying to ascertain the current performance of providers. Nearly half of surveyed QIO directors expressed similar concerns about the data processing performed for QIOs by CMS' contractors (44 percent of responding QIO directors).

**7. Feedback from CMS to QIOs would be more effective if CMS government task leaders had more health care QI experience.**

Thirty-nine percent of surveyed theme leaders reported their CMS government task leader had a fair to poor knowledge base relative to their responsibilities. As a result, they had difficulty understanding the issues faced by QIOs and limited ability to help QIOs solve problems. This finding was echoed in site visits and by some surveyed QIO directors. Having task leaders with more of a QI background would facilitate (a) alignment of QIO technical assistance with other CMS QI programs (suggestion 1), (b) flexibility in allowing QIOs to adapt their QI strategies to state and local QI environments (suggestion 3), and (c) the timely actionable feedback to QIOs based on their progress reports (suggestion 8).

### **QIO Operations and Activities**

**8. QIO operations would be more efficient and effective if CMS reporting requirements were streamlined and resulted in timely, actionable feedback to QIOs.**

Many QIO officials reported that the reports required by CMS could be streamlined and made more useful. Many also reported that they would welcome timely, constructive feedback from CMS on ways to improve their performance based on those streamlined reports.

**9. Future SOWs could test the effectiveness of expanding QIO direct training of provider staffs.**

Although QIO theme leaders reported frequently using direct training of provider staff as an approach to technical assistance in the 9th SOW, our site visit interviews did not evidence this focus and suggested this method could be tested for effectiveness and expansion for both hospitals and nursing homes. Many provider staff interviewed commented that such training would be welcomed, because the staff pay more attention when an “outsider” instructs them, rather than the QI director. This is also consistent with survey results, in that surveyed 43 percent of nursing home respondents wanted the QIO to provide future support for clinical topics such as pressure ulcers or pain.

**Measurement of QIOs’ Performance**

**10. For QIOs’ work with troubled nursing homes, a comprehensive measurement of performance would be more meaningful.**

For the NHIN theme, several QIO officials and providers reported that the assistance needed by the targeted group did not match the two performance measures applied to the theme. These facilities needed more general QI support as a first step, and there were quality problems in the facilities that were important but did not match the measures. Instead of measuring QIO work with troubled nursing homes through improvements on two specific measures (pressure ulcers and physical restraints), CMS could structure a more meaningful composite measure, using experience it has developed in creating star ratings for nursing home quality and/or composites for a pay-for-performance demonstration. This would allow the QIO to work as needed on any specific problems associated with any of the larger set of measures in the composite. This is consistent with the suggestions of some surveyed QIO directors who said that supportive and consultative work to nursing homes should be expanded (11 percent of responding QIO directors).

**11. QIO performance metrics would be more meaningful if they took into account the often small numbers of providers included in the metrics.**

In the 9th SOW, CMS’s assessment of an individual QIO’s performance was based on the mean of the performance scores of a defined set of providers. Failing on any measure triggers CMS to consider consequences including not funding remaining work on the theme. The 9th SOW performance scores for some QIOs were computed on the basis of relatively small numbers of providers. CMS did not take into account the lack of statistical precision of these scores during its evaluation of QIO performance. For most themes, CMS does allow QIOs “extra room” before considering them to have failed—for example, a QIO would fail the pressure ulcers measure only if improvement was below 70 percent of the target improvement. However, a better strategy may be allowing QIOs to focus only on those measures that are common enough in their state to produce reliable measurement (see suggestion 3).

## QIO Program Evaluation

### **12. Future evaluations of the QIO Program should include formative, mixed-method approaches, along with impact evaluation focused only on those components that can be structured to allow attribution to the QIO using an appropriate comparison group.**

Traditional impact evaluation of the QIO Program is necessarily limited to themes in which a comparison group of nonparticipating providers that is in all ways statistically equivalent to the group of participating providers (besides participation with the QIOs) can be identified, so that we can estimate what participating providers' performance would have been without the QIOs. Traditional impact evaluations thus often require time to acquire datasets with substantial lags and to complete complex statistical analyses. A formative evaluation would be designed to provide critical information for program improvement on a timeframe so as to enable the QIO Program to adopt the lessons learned more quickly than is possible with a more traditional evaluation approach. The usefulness of mixed methods is demonstrated in this evaluation, where likely reasons for shortcomings could be discerned due to the combination of qualitative and quantitative analysis.

If CMS uses QIOs as a laboratory for testing alternative forms of technical assistance, the evaluation might benefit from an orthogonal design, which allows for the testing of several variants of technical assistance simultaneously (Brown and Zurovac 2011). Such an approach would also be useful for testing different models of care (such as the various models to reduce readmissions) or different combinations of interventions that share the same outcome goal against one another. However, in addition to enabling testing of many alternatives at the same time, orthogonal design is highly appropriate in this context because it does not involve a traditional control group. Rather, this design allows that nearly all intervention areas (or units) receive a form of the intervention.

## I. INTRODUCTION

The Quality Improvement Organization (QIO) Program is a key component of the agenda of the Centers for Medicare & Medicaid Services (CMS) for ensuring and improving quality of care for Medicare beneficiaries. As required by Sections 1152–1154 of the Social Security Act, CMS contracts with a nationwide network of independent QIOs to aid health care providers in the delivery of high quality care to Medicare beneficiaries. The contracts last for three years, with each contract cycle called a statement of work (SOW). The 9th SOW began on August 1, 2008, and ended July 31, 2011. With budgets of approximately \$1.1 to \$1.2 billion dollars for the current and preceding SOWs, the QIO Program is the single largest investment in quality improvement infrastructure—public or private—in the nation.

Several recent reports have critically examined the QIO Program’s independent contributions to improvements in the quality of care for Medicare beneficiaries. These include a congressionally mandated report by the Institute of Medicine (IOM) published in 2006 and a study of the QIO Program commissioned by the Assistant Secretary for Planning and Evaluation (ASPE) and published in 2007. As part of its report, the IOM concluded, in part, that “although the quality of care received by Medicare beneficiaries has improved somewhat, researchers have been unable to attribute these changes to the QIO Program,” noting the difficulty of disentangling the effects of QIO activities from many concurrent quality improvement efforts nationwide (IOM 2006). Among other recommendations for the program as a whole, IOM recommended an evaluation using more rigorous methods. ASPE’s study similarly concluded that the literature is ambiguous on the effectiveness of the program and that previous studies have suffered from a variety of methodological problems (Sutton et al. 2007). In 2006, then-secretary of the U.S. Department of Health Human Services (HHS) Michael Leavitt responded to the IOM report in a Report to Congress, acknowledging the need for research to determine whether observed improvements in Medicare beneficiaries’ quality of care over time could, in fact, be attributed to the work of QIOs (Leavitt 2006). As part of its efforts to meet that need, CMS engaged Mathematica to design and conduct an independent evaluation of the QIO Program’s 9th SOW with the issue of attribution an important focus of this evaluation.

This report presents the findings of CMS’s independent evaluation of the 9th SOW. Specifically, the report presents:

- Estimated impact of selected components of the 9th SOW on the quality of care of Medicare beneficiaries, based on claims and other Medicare administrative data
- Perceived effectiveness of the QIO Program as reported by physicians, hospitals, and nursing homes
- Effects of selected components of the 9th SOW on reducing healthcare disparities
- Relative effectiveness of various approaches pursued by different QIOs to providing technical assistance to health care providers
- Influence of provider characteristics and health care environments on QIOs’ effectiveness

To provide context for these findings, the report begins with an overview of quality improvement environments in which QIOs operate, the services they provide, and QIOs’ experiences with the 9th SOW contract.



The scope of this evaluation, however, is circumscribed in two ways. First, one component of this evaluation—beneficiary protection—is excluded. CMS evaluated the beneficiary protection theme separately in 2009 (Mitre 2009). Second, this evaluation assesses the QIO Program as a whole and does not evaluate individual QIO organizations. There are 53 QIO contracts, and CMS assesses each individual performance at the mid-point and the 28th month of each SOW. This separate performance appraisal is called the contract evaluation.

## A. Purpose and Design of the QIO Program

The primary purpose of the QIO Program is to improve the quality of health care delivered to Medicare beneficiaries. The QIO Program achieves this goal primarily by providing technical assistance services to physicians, hospitals, and nursing homes that care for Medicare beneficiaries. In a few components of the 9th SOW, QIOs also provided services directly to beneficiaries and worked collaboratively with other organizations involved in quality improvement. The 9th SOW focuses QIO technical assistance services on the following areas, called “themes.” (The shorthand name used in this report for each theme is italicized.)<sup>1</sup>

- Improving preventive care (*core prevention* theme)
- Improving patient safety (*patient safety*). This theme contains the following subthemes that, for simplicity, we also refer to as themes:
  - Improving surgical and heart failure care in hospitals (Surgical Care Improvement Project/Heart Failure or *SCIP/HF*)
  - Reducing methicillin-resistant staph aureus infections in hospitals (*MRSA*)
  - Reducing physical restraints in nursing homes (*physical restraints*)
  - Reducing pressure ulcers in nursing homes (*pressure ulcers*)
  - Assisting troubled nursing homes, selected from those with enough deficiencies to have been placed on the Special Focus Facilities list, which triggers increased oversight from state regulators (*nursing homes in need or NHIN*)
  - Improving drug safety through partnerships with Medicare Advantage or Part D prescription drug plans, and/or Medicare providers and practitioners (*drug safety*)
- Reducing hospital readmissions by improving transitions of care between hospital care and post-hospital care (*care transitions*, piloted in 14 selected states)
- Improving disparities in diabetes care and preventive services (*prevention disparities*, piloted in 6 selected states)
- Improving testing and care for chronic kidney disease (*CKD*, piloted in 11 selected states)

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<sup>1</sup> Throughout the report we will also use “states” to include states, territories, and the District of Columbia.

- Protecting beneficiaries from substandard health care, investigating and resolving beneficiary appeals and complaints, and assisting hospitals in reporting quality measures (*beneficiary protection*, not covered by this evaluation)

In summary, there are eight nationwide themes that all QIOs worked on—core prevention, SCIP/HF, MRSA, physical restraints, pressure ulcers, NHIN, drug safety, and beneficiary protection—and three “subnational” pilot themes—care transitions, prevention disparities, and CKD—that selected subsets of QIOs worked on.

For each theme, the contract specifies a range of services each QIO should offer, providers to whom the services should be offered,<sup>2</sup> and performance measures to be assessed during the contract. QIO technical assistance services include seminars/webinars, conference presentations, learning collaboratives, root cause analysis, and clinical workflow analysis. QIOs’ requirements for targeting and recruiting providers varied widely from theme to theme. Some themes required QIOs to formally recruit “participating providers” (PPs) that had to execute signed agreements to work with the QIO (and some of these themes, in turn, listed specific criteria that recruited providers had to meet). Later in the report, we refer to nonparticipating providers as “NPs.” Other themes only required QIOs to informally organize willing providers and organizations into coalitions to work on topics. Three themes (pressure ulcers, physical restraints, and SCIP/HF) required QIOs to recruit at least 85 percent of PPs from a list of poor performers (also called the J-17 list). These requirements often meant that QIOs were working with a very small proportion of providers in the state. The J-17 lists for the three themes typically encompassed less than a quarter of providers in a state, often fewer than 10 percent.<sup>3</sup>

QIO Support Centers (QIOSCs) are organizations that CMS contracted with to provide various support services to all QIOs and each major theme had a QIOSC. The theme QIOSCs were responsible for regularly convening QIO staff working on the theme, developing or otherwise supplying tools and resources, sometimes providing individual QIOs data and reports related to the theme, and other support functions. CMS also contracted with various data processing organizations to provide support by furnishing data files to each QIO on an ongoing basis; the QIOs could then analyze these data to target their interventions and monitor progress.

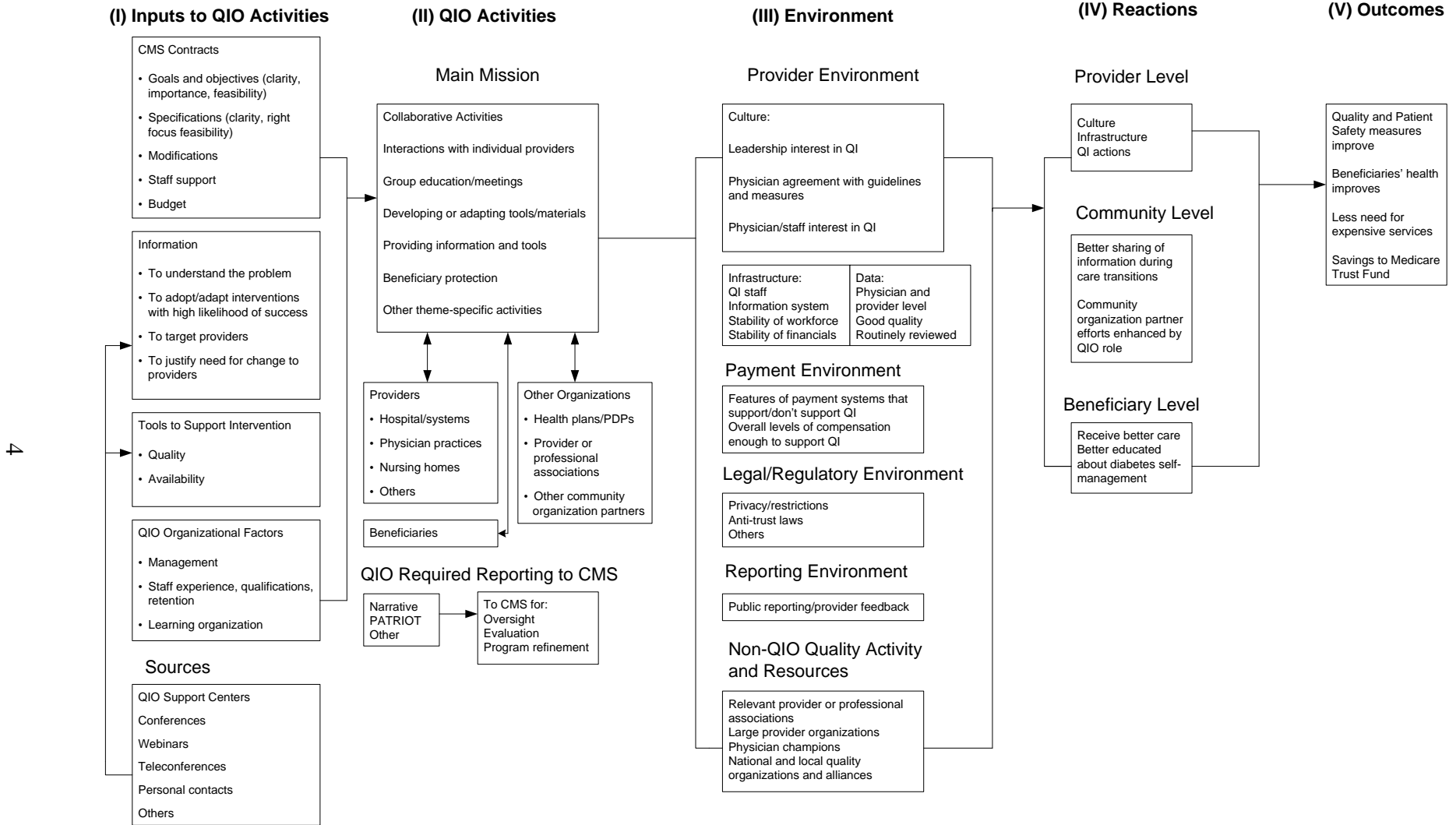
Figure I.1 summarizes how the QIO Program is intended to improve the health care of Medicare beneficiaries, and Table I.1 summarizes each of the 9th SOW themes.

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<sup>2</sup> QIOs offer services directly to beneficiaries for two themes (prevention disparities and beneficiary protection), and for three others (drug safety, CKD, and care transitions) worked with various advocacy and provider organizations. For all remaining themes, QIOs worked primarily with providers.

<sup>3</sup> In the SCIP theme, the J-17 lists for 10 states included fewer than 10 percent of hospitals in each state; in fact, in 3 states, the J-17 lists contained no hospitals. Similarly, in the pressure ulcer theme, the J-17 lists for 26 states contained fewer than 10 percent of nursing homes in the state (including 3 with no nursing homes); this was the case in the physical restraints theme for 29 states (5 states with no nursing homes).

**Figure I.1. Conceptual Model of the QIO Program**



**Table I.1. Summary of 9th SOW Themes**

Themes	Targeted Participants	QIO Interventions	Targeted Outcomes/ Goals
<b>Beneficiary Protection<sup>a</sup></b>			
Multiple utilization, quality of care, beneficiary appeal reviews	No targeting or recruitment involved	Case reviews of quality of care, utilization, and potential anti-dumping cases; handling of appeals; quality improvement activities; alternative dispute resolution; sanction activities; other related activities	Beneficiary satisfaction, timeliness of case reviews
Assisting hospitals with Reporting Hospital Quality Data for Annual Payment Update (RHQDAPU) <sup>b</sup>	Hospitals	Technical assistance for reporting and dealing with CMS audits	Increased reporting to RHQDAPU, assistance with audits
<b>Patient Safety Theme<sup>c</sup></b>			
Hospital SCIP/HF	Hospitals	National QI leaders “train the trainers” model Provider education QI collaboratives	SCIP/HF measures
Hospital methicillin-resistant staph aureus (MRSA) infections	Hospitals	TeamSTEPPS “train the trainers” model Provider education QI collaboratives	Hospital MRSA incidence/prevalence
Nursing home pressure ulcers <sup>c</sup>	Nursing homes	National QI leaders “train the trainers” model Provider education QI collaboratives	NH pressure ulcers
Nursing home physical restraints	Nursing homes	Training (national QI leaders) Provider education QI collaboratives	NH physical restraints
Nursing Homes in Need	Nursing homes	Intensive assistance Root cause analyses Action plans	NH pressure ulcers NH physical restraints
Drug Safety	Medicare providers and practitioners Medicare Advantage (Medicare Part C) plans Part D prescription drug plans	Wide range of possible assistance—staff time, data, lists of public websites and resources, QIOs’ general quality improvement expertise and tools	Drug–drug interactions Potentially inappropriate medications
<b>Prevention Theme</b>			
Cancer screenings/vaccinations	Primary care physician (PCP) practices	Provision to practices of: Education Consultation Technical assistance	Mammography Colorectal cancer screening Influenza vaccinations Pneumococcal vaccinations

Table I.1 (continued)

Themes	Targeted Participants	QIO Interventions	Targeted Outcomes/ Goals
<b>Prevention Disparities Theme</b>			
Diabetes monitoring	PCP practices serving underserved	Provision to practices of: Education Consultation Technical assistance	Hemoglobin A1c testing Diabetic eye examination Lipid testing (among Physical Quality Reporting Initiative (PQRI) practices) Improve rates of blood pressure control
Beneficiary Diabetes Self-Management Education (DSME)	Underserved beneficiaries	DSME: Project Dulce Diabetes Education Empowerment Program (DEEP)	Number of beneficiaries trained
<b>Care Transitions Theme</b>			
Working with intervention communities	Communities	Build community coalitions to implement one or more care transitions interventions involving: “Coaching” beneficiaries at hospital discharge Post-discharge followup and education of beneficiaries Increasing communication between hospital and post-acute providers	Hospital readmissions
<b>Prevention—CKD Theme</b>			
Urinary microalbumin testing	PCP practices	Provision to practices of: Education Consultation Technical assistance	Urinary microalbumin testing
Treatment with ACE-I/ARB drugs	PCP practices	Provision to practices of: Education Consultation Technical assistance	Treatment with ACE-I/ARB drugs
Arteriovenous (AV) Fistula	Nephrology practices and other physician practices	Provision to practices of: Education Consultation Technical assistance	End Stage Renal Disease (ESRD) patients starting hemodialysis via AV fistula, or ESRD patients starting hemodialysis with AV fistula in place, even if not mature
Community collaboration activities to support all CKD goals (urinary microalbumin testing, ACE-I/ARB drugs, AV fistula)	Wide range of organizations to form statewide or regional coalitions and partnerships	Build and/or sustain state or local coalitions and partnerships with a wide range of organizations to: Advance one or more of the clinical focus areas Work towards systematic quality improvement in CKD prevention and care	System-level change

Source: QIOs’ 9th SOW contracts: original dated August 1, 2008, and contract modification dated July 9, 2009.

<sup>a</sup>Not part of this evaluation.

<sup>b</sup>Now known as the the Hospital Inpatient Quality Reporting Program or HIQRP.

<sup>c</sup>The QIOs’ contract modification of July 2009 also added “Rural-Focused Patient Safety Projects,” which were primarily a rural-focused variant of the patient safety themes.

<sup>d</sup>The QIO 9th SOW originally included a hospital pressure ulcers component that was discontinued by CMS in February 2010.

## **B. Overview of Evaluation Methods**

### **1. Qualitative Data from Site Visits and Partner Interviews**

Our evaluation included site visits to eight states during which we interviewed staff at QIOs and key stakeholder organizations and many provider types, telephone interviews with partners working with the QIOs in selected themes, several surveys, and numerous quantitative data analyses. The methods underlying these approaches are described in detail in Volume II, Chapter I, including the methods for the site visits and partner interviews. Methods highlights for the qualitative data sources include:

- The surveys of QIOs were of all QIO directors and all QIO theme leaders for themes included in our study, and the survey was completed by 98 and 97 percent of the targeted groups. Therefore the data from these surveys are reliable and complete.
- National surveys of hospitals and nursing homes were of large, stratified random samples of hospitals and nursing homes, respectively (including many that did and did not participate in QIO 9th SOW activities). The large size of the sample (1023 hospitals and 1001 nursing homes) along with the high response rates of 78 and 77 percent mean the reader can be confident that the results of the surveys are meaningful.
- Discussions with partner organizations for the care transitions and CKD themes provided rich information for 63 Care Transitions collaborators and provider partners and 53 CKD collaborators and provider partners. This set of interviews was not intended to represent all collaborators and partners for these themes, nor were these interviews expected to shed light on the extent of program impact. Rather, project resources were targeted to collaborators and provider partners who were among those more actively involved in the theme, to best understand the types of care changes that may have occurred in some provider organizations as a result of their participation, and the types of QIO assistance and roles that were perceived as particularly helpful.
- The eight sites identified for site visits (to eight QIOs and providers and health leaders they work with) were selected to provide a mix of characteristics in terms of their geography, population size, budget per provider they worked with, and theme participation to ensure inclusion of subnational as well as national themes. Providers to interview at each site were selected randomly from among those feasible to visit, from lists of participating providers. While we ensured a neutral process of site and provider selection, we had to replace our initial provider selections at a fairly high rate (51 percent were replaced) due to passive refusals (failure to return our calls) or turnover (e.g. a new person knew nothing about the QIO activities). Therefore the providers we spoke with on the site visits may have been more involved with the QIO and potentially more favorable towards the activities than if we had been able to interview all those we initially approached.

We considered the strengths and limitations of each of the qualitative data sources as we used the information from them in analysis and development of program improvement suggestions.

## 2. Surveys of QIO Staff and of Hospitals and Nursing Homes

We conducted and analyzed four separate surveys: (1) QIO directors, (2) QIO theme leaders (the staff within each QIO responsible for a theme), (3) nationally representative sample of hospital quality improvement (QI) directors, and (4) nationally representative sample of nursing home administrators (Table I.2).

**Table I.2. Surveys Conducted for the Evaluation of the QIO 9th SOW**

Name of Survey	Fielding Period	Number of Respondents Targeted or Sampled	Number with Completed Responses	Response Rate
QIO Director Survey	Mid-November 2010–mid-January 2011	46	45	97.8
QIO Theme Leader Survey	Mid-November 2010–mid-January 2011	393	380	96.7
Care Transitions <sup>a</sup>		13	13	100.0
Chronic Kidney Disease (CKD) <sup>a</sup>		11	11	100.0
Nursing Homes in Need		48	47	97.9
Physical Restraints		48	47	97.9
Drug Safety		52	50	96.2
MRSA		53	52	98.1
Pressure Ulcers		52	51	98.1
SCIP/HF		51	48	94.1
Core Prevention		53	52	98.1
Prevention Disparities <sup>a</sup>		6	6	100.0
Hospital Quality Improvement (QI) Director Survey (Telephone)	Late 2010–early 2011	1,023	788	77.0
Nursing Home Administrator Survey	Late 201–early 2011	1,001	784	78.3

Note: There were 53 QIOs. The number of QIO directors and QIO theme leaders represents a census of these individuals.

<sup>a</sup>The care transitions, CKD, and prevention disparities themes are subnational, so there are fewer responses. The hospital QI director and nursing home administrator surveys are nationally representative. Both surveys featured stratified sampling based on J-17 thresholds (cut-off points identifying the list of poor performers to be targeted for themes). Both sample sizes were reduced from the originally released samples due to the surveys running longer than anticipated and exceeding available resources—more details are contained in Volume II Chapter I. Both surveys were administered through computer-assisted telephone interview (CATI).

## 3. Impact Analyses

In addition to the survey analysis, we also completed several descriptive and impact analyses using various CMS and QIO administrative and quality of care databases. We measure the impact of the QIO Program by comparing the health care quality measures of providers who received services from a QIO (the intervention group, also referred to as PPs) to similar providers that did not (the comparison group, also known as NPs).

Beyond QIOs, there are many forces and initiatives sweeping across the country to foster health care quality improvements. These include other organizations providing technical

assistance, public reporting of quality scores, confidential feedback reports to providers of their quality scores, linking provider payment to quality of care, and programs designed to improve the coordination and integration of care delivery such as medical homes and accountable care organizations. Any or all of these QI programs may have a positive impact on health care quality. However, these influences are, on average, affecting intervention and comparison group providers equally, and our goal is to measure the marginal effect of QIOs in addition to these other influences.

Ensuring that the intervention and comparison groups are similar in all ways, except that one received services from a QIO and the other did not, is essential for producing unbiased estimates of the impacts of the program—the goal is to select or create a comparison group that is “statistically equivalent” to the group of providers (and their patients) who benefitted from QIO services. Since there were wide differences across themes in how QIOs recruit providers, our methods to construct comparison groups varied correspondingly, and there were some themes for which it was simply not possible to achieve the goal of creating a comparison group statistically equivalent to the intervention group.

However, for themes in which it was possible to select a valid comparison group, we applied two statistical approaches that have not previously been used in QIO Program studies. For themes in which CMS gave each QIO a list of low-performing providers to work with, we used a regression discontinuity approach to estimate impacts—we estimated program impacts by comparing the providers just below the performance cut-off to be included on CMS’s list to providers just above the cut-off. The performance cut-off for inclusion on CMS’s list served as the “discontinuity” in the regression discontinuity approach. For themes targeting entire communities or regions, we used a propensity score matching approach. In this approach, we carefully matched treatment regions (and thus the providers and patients in those regions benefitting from QIO services) to comparison regions with similar characteristics (and the providers and patients in those regions). The details of our estimation approach are presented in Volume II, Chapter II of this report.

It is also worth noting that the underlying data used for the analyses, which are created by CMS and its contractors, feature unavoidable delays due to the time required to collect, process, and create the final datasets. The time periods covered by the data we used for this report are displayed in Figure I.2.

Our approach to estimating program impacts assumed that the QIO Program operated as it was designed by CMS. Specifically, if the 9th SOW specified that the QIO was to limit services to PPs, we assumed that NPs did not receive QIO services, drawing the comparison group from the population of NPs. To the extent that the QIO Program operated in the field as specified in the 9th SOW, this approach, combined with the statistical safeguards described in Volume II, Chapter II, minimized the risk of falsely attributing quality improvements caused by other factors to the QIO Program.





However, site visits revealed that, in some instances, the QIO Program did not work in the field as specified in the 9th SOW. Two of these differences may have introduced a bias into our impact estimates. First, many QIOs provided services jointly with other organizations and/or statewide. For example, many QIOs made presentations at statewide conferences of providers that were sponsored by other organizations, which may have benefitted some members of the comparison group. Also, QIO services to support hospitals' public reporting and receipt of the full annual payment update were provided to all hospitals and may have included linking both nonparticipating and participating hospitals with QI resources.

If NPs benefited from QIO services, either because the QIO offered services directly to the NP or because the NP received services from a QI organization that partnered with the QIO to provide a helpful workshop, then our impact estimates may be biased downward. Without data on the magnitude of such "contamination" of the comparison group, it is not possible to confirm the existence, or gauge the magnitude, of this bias.

### **C. Organization of the Report**

The report is presented in three volumes. Volume I begins by providing a description of the QI environment in which QIOs operate, types of technical assistance services they provided in the 9th SOW, experiences recruiting providers, and experiences with the 9th SOW contract in general. Volume I then goes on to summarize the estimated impacts of the overall QIO Program as well as impacts for different types of QIO services and impacts on different subgroups of providers and beneficiaries. These findings are organized by theme. For each theme, the findings draw from both quantitative sources (CMS administrative and claims data) and qualitative sources (site visit and survey data). We identify these data sources at the beginning of each section. The volume also presents the assessments of the QIO Program by QIOs, providers, and other stakeholder organizations. It concludes with twelve suggested program design improvements.

Volume II documents our methods in detail. Specifically, it documents our approach to constructing comparison groups, estimating impacts, identifying subpopulations, defining types of QIO services, surveying QIOs, providers and other community stakeholders, and conducting site visits. Volume II also presents the results of several additional analyses that supplement Volume I's main findings.

Volume III is composed of our survey instruments and discussion guides which were used to collect qualitative data for our evaluation.

## **II. QUALITY IMPROVEMENT ENVIRONMENT IN WHICH QIOs OPERATE**

QIOs do not function in a vacuum, and the environments in which they operate, described in this chapter, can help or hinder their efforts. The findings are based on national surveys of QIOs, hospitals, and nursing homes described in the preceding chapter, discussions with a sample of partner organizations working with QIOs in the care transitions and CKD themes, and site visits to eight states, which included in-person interviews with QIO staff, other organizations involved in QI, physician practices, hospitals, and nursing homes.

### **A. Other Organizations Sponsoring Quality Improvement Initiatives**

Many states already have multiple organizations, such as provider associations, whose mission and goals are similar to those of QIOs. QIO theme leaders reported in our national survey that the QIOs and provider associations typically focus on overlapping quality issues and target overlapping sets of providers. Seventy-one percent of theme leaders said that their theme overlapped with the work of at least one association, and 73 percent said that providers targeted by the QIO overlapped with those targeted by the provider associations.

A large majority of QIO theme leaders (82 percent of survey respondents) reported substantial collaborations with these associations. Moreover, 90 percent reported that they or their theme staff attended and spoke at association-sponsored meetings at least once per year. Ninety-one percent of respondents reported talking periodically with association representatives to avoid duplicating efforts.

QI resources and organizations appear particularly abundant in the hospital sector. According to the hospital survey, 59 percent of all hospitals look to a larger corporate entity to which they belonged for QI support and more than 75 percent were engaged in one or more initiatives unrelated to QIOs' or their corporate entity's work. Over half of hospitals participated in one or more national-level initiatives while 44 percent participated in one or more state, local, or regional efforts. Initiative sponsors were most commonly provider or professional associations, followed by governments and the Institute for Health Improvement. The survey results were consistent with our site visit findings; in only one of the eight states visited was the QIO consistently reported as the only QI organization in the state and the main influence on QI.

In contrast, nursing homes appear much less likely than hospitals to participate in non-QIO and non-corporate sponsored QI activities. Among the 67 percent of nursing homes that were owned by or affiliated with a larger organization, 62 percent reported pursuing QI activities with that organization, a pattern similar to that seen among hospitals. However, only about a third of all nursing homes were involved in any QI efforts unrelated to the QIOs or their corporate entity (compared to over three-fourths of hospitals). In addition to QIOs, nursing home associations and corporations were frequent sponsors of QI conferences, seminars, webinars, or teleconference presentations. Our site visits likewise found active nursing home associations in most states but also confirmed that nursing homes may have fewer QI resources and organizations available to them compared to hospitals. For example, one site visit interviewee noted that while the state nursing home association provided useful quality initiatives, "the membership fee [for the association] is too expensive and many of the small facilities do not belong to the association."

While the degree of involvement and intensity of activities varied, nearly all physician practices we interviewed during our site visits mentioned some pursuit of non-QIO quality improvement activities. Unlike with hospitals and nursing homes, we did not have a nationally representative physician survey with which to confirm the themes that emerged from comments of visited practices. In fact, we suspect the practices that we visited may have been especially engaged with QI efforts and thus more willing to participate with the QIO and to speak with us. Interviewees told us that state-level primary care associations were important sources of QI support for federally-qualified health centers. Some practices had begun working with their state's Regional Extension Center to improve their electronic health record (EHR) use and gain incentives under the Medicare and Medicaid EHR Incentive Program. Other practices had undertaken QI projects as part of their physicians' requirements to maintain board certification. Some practices mentioned involvement with medical home pilot projects; others cited private pay-for-performance programs that supplied claims data-based reports on the provision of preventive services (although these reports were limited to patients covered by that payer). Other respondents noted continuing medical education programs offered by professional associations and a peer-benchmarking effort coordinated by an EHR vendor.

## **B. Providers' Support for Improving Quality**

The impact of QIOs on patient care must occur through changes in providers' behavior; QIOs should therefore be more effective in a given theme when providers' culture and infrastructure (e.g., staffing, information systems) are supportive of quality improvement in that theme. Our survey thus asked theme leaders to use their knowledge of the provider environment statewide and agree or disagree with a series of statements on providers' supportiveness of QI for their theme. Responses to these statements were based on a four-point scale (strongly agree, agree, disagree, and strongly disagree):

- Senior leaders in the provider environment care about their quality performance as related to this theme.
- Providers regularly review data on their performance related to this theme,
- Providers perceive a strong business case for quality improvement on the measures important to this theme.
- Providers have staff who are educated or otherwise qualified to support improvement efforts.
- The number of physician champions is adequate to help facilitate improvement on key measures for this theme
- Many providers lack motivation to improve.
- The limitations of provider information systems remain a large barrier to improvement.
- Workforce turnover is a large barrier to improvement.

We combined all responses on the above items into a composite provider supportiveness score (see Volume II, Chapter II, SectionF). Higher values indicated a more supportive provider

environment. The maximum value was 10, when all responses were “strongly agree” to all favorable statements and “strongly disagree” to unfavorable statements.<sup>4</sup>

Provider environment scores varied by theme with an overall mean score of 5.3 (Table II.1). Not surprisingly, given this relatively low average, provider recruitment was challenging for all themes, and in some cases prevented QIOs from reaching their initial recruitment targets due to lack of provider interest. For the prevention theme and its three subnational themes (prevention disparities, CKD, and care transitions) between 60 and 100 percent of theme leaders reported spending “a lot of effort” to secure enough providers, and for the prevention and prevention disparities themes, 29 and 33 percent, respectively, were unable to achieve recruiting targets.

**Table II.1. Supportiveness of the Provider Environment: Mean Score (maximum 10)\***

Themes	Mean Provider Environment Score
Care Transitions (n=13)	5.2
Pressure Ulcers (n=51)	4.6
Physical Restraints (n=47)	4.5
CKD (n=11)	4.6
SCIP/HF (n=48)	5.9
MRSA (n=52)	6.3
Prevention (n=52)	5.5
Prevention Disparities (n=6)	5.1
Overall average (n=280)	5.3

Source: Survey of QIO theme leaders

\*The questionnaire for the NHIN and drug safety theme leaders did not include these questions, due to the state-to-state variation in targeted providers for drug safety projects, and the focus of the NHIN theme on just a few nursing homes on the Special Focus Facility list.

MRSA and SCIP themes had the highest supportive environment scores at 6.3 and 5.9. Regarding SCIP/HF, one hospital QI director noted, “Hospitals see a business case for quality, because of the value-based purchasing . . . you put a dollar sign to it, it will jump to the top of the list.” Although the SCIP/HF theme leads gave high ratings to the supportiveness of the provider environment overall, they also noted that among hospitals that performed poorly on SCIP/HF, lack of provider support remained a key contributor to poor performance. Specifically, over 80 percent of SCIP/HF theme leaders identified physician skepticism of the guidelines relevant to the theme, or of guidelines in general, as a major cause of poor performance, a much higher percentage than for other themes, where an average of 44 percent of theme leads cited physician resistance. During a site visit, a hospital executive echoed this

<sup>4</sup> Response to each item was scored on a 0-3 scale with 3 most positive. For each item, the total across the items was divided by the maximum number of possible points. Maximum points were usually 24 (3 x 8 items) but could be fewer if the respondent skipped an item entirely. The result was multiplied by 10 to set the results on a 10-point scale.

survey finding by commenting, “There was a certain rigidity to the measures that the physicians don’t buy into.”

The core prevention theme had the third highest score. One theme leader commented, “They’re [physicians] receptive to improvement as long as they take part in the process.” Another explained, “They have made a significant investment in technology, and we can help them optimize that investment, so they’re interested in working with us.” Not everyone agreed, however, as one theme leader commented, “They view changing as too hard or too big of a burden, especially if the doctor does not delegate.”

The two nursing home themes (pressure ulcers and physical restraints) as well as CKD had scores indicating the least supportiveness, at 4.6, 4.5, and 4.6 respectively. Thus, one would anticipate QIOs would face the greatest challenges making headway in these three themes.

As pointed out by theme leaders in several of our site visits, the lower scores for nursing home themes may be due in part to the paramount importance of the state certification survey for the nursing homes. For example, one theme leader commented, “Nursing homes may lack motivation if they have not received [state survey] citations . . . for most facilities that I know well the priority is on the census, not on quality.”

## C. Barriers to QI

The QIO survey, the surveys of hospitals and nursing homes, and our site visits provided insights into the barriers to QI faced by hospitals, nursing homes, and physician offices.

### 1. Hospitals

Hospitals (and by extension QIOs) clearly face many challenges to quality improvement. The top six barriers to QI reported by hospitals in the survey were (1) documentation issues, (2) physician disagreement with measures, (3) lack of physician interest or involvement, (4) financial constraints, (5) lack of QI-trained staff, and (6) priorities other than QI. Between 55 and 75 percent of hospitals reported each of these was a major or minor barrier, with between 13 and 26 percent of hospitals citing each of these as a major barrier.

Our site visit interviews with hospital and QIO staff not only shed more light on these barriers but suggested new ones as well.

- **Lack of supportive EHR systems.** Several interviewees mentioned the lack of supportive EHR systems as a barrier, with one QIO describing its state as “behind the curve electronically.” Although ostensibly a documentation issue, a lack of EHRs also hampers the implementation of default ordering (“hard-wiring”) of many quality process measures.
- **Physician resistance to change.** On the survey topics of “lack of physician interest or involvement,” and “physician disagreement with measures,” respondents repeatedly mentioned physicians’ resistance to change. They noted, “Some [physicians] don’t believe it would improve care,” that they “Insist on doing it as they were trained,” and that, for some rural physicians, “There is a cowboy mentality—they don’t want anyone telling them what to do.”

- **Resource constraints and “quality initiative fatigue.”** Respondents’ comments indicated that some survey topics— financial constraints, lack of QI-trained staff, and “other priorities” were interrelated. The site visits clarified how some hospitals, particularly small, independent ones, are struggling with limited staff, constrained financial resources, and a long list of quality measures on which they could or should improve. One hospital staff member described “quality initiative fatigue . . . everything can’t be the focus.” Another indicated that while, “we have to pick the ones that are the biggest bang for the buck,” he confessed his hospital has difficulty knowing which ones those are. Others explained that it is not just enough to have QI-trained staff in the quality department—the entire hospital needs to be on board to effect change, “It is hard to take employees away from the front lines for training or education,” said one respondent, and another spoke of how the local nursing shortage led to understaffed and overwhelmed nurses with little time or energy for quality improvement.
- **QI falls behind other priorities.** A few QIO and hospital respondents took a broad perspective, clarifying how organizational and cultural factors contribute to hospitals’ choosing “other priorities” than quality improvement. One respondent commented that hospitals in the state do not see quality improvement as important, believing that “their existence and ability to provide care is pretty much all they need to do.” Another remarked, “CEOs are just business people” [who thus do not perceive QI as important without a clear business case]. A third respondent expressed a similar view. “There is no financial incentive until value-based purchasing begins.”
- **Staff turnover and communication issues.** Finally, interviewees raised a host of other challenges facing hospitals. Turnover of QI or infection control staff was a challenge for one region. A teaching hospital pointed out how the constant rotation of residents and attending physicians made QI difficult. Two respondents cited examples of poor communication and coordination between hospital departments, such as how “the operating room and the QI department don’t talk,” or infection control and QI don’t coordinate, or QI and nursing leadership don’t work together or agree with each other. One state’s QIO had to contend with frequent and disruptive hospital buy-outs and mergers.

## 2. Nursing Homes

In contrast to the hospital analysis, the survey and site visit findings for nursing homes diverged in several respects. The nursing home survey identified a number of QI barriers but most were rated as minor. Nursing homes cited the following barriers in the survey: documentation problems, in which care was recorded incorrectly (60 percent), lack of nursing interest or involvement (42 percent), too few staff trained in QI (40 percent), financial constraints (39 percent), and nursing homes placing higher priority on topics other than QI (26 percent). However, no more than 11 percent of respondents rated any of these barriers as “major.” Our site visit discussions, however, indicated the existence of several major, widespread barriers to QI.

- **Leadership and staff turnover.** In seven of eight states we visited, staff in many nursing homes reported that leadership and staff turnover were a major barrier to improvement. Turnover at both the managerial and front-line levels can interrupt relationships and trust that QIOs have built up with facility staff over time, cause loss

of staff trained in QI methods, and ultimately slow or halt ongoing QI projects. One respondent explained that small nursing home organizations have difficulty providing adequate compensation to good administrators. High turnover among front-line staff may simply reflect high rates of job dissatisfaction. One respondent cited a recent survey of nursing home staff that showed that 50 percent of front-line workers disliked working in the industry.

- **Unmet need for staff education.** In four of the eight states we visited, staff in nursing homes reported an unmet need for better staff education. For example, respondents said “Nursing homes are way behind hospitals in the level of staff education and expertise” and “Staff education is needed.” A QIO in a larger state pointed out how the lack of trained staff meant the time frame for the pressure ulcers theme was too short, since “it takes 12 months just to educate everyone.” At the same time, two nursing homes commented it is hard to get staff training into the budget.
- **Financial and medico-legal incentives undermine nursing home themes.** One respondent pointed out Medicare’s requirement that beneficiaries have a three-day hospital stay to qualify for skilled nursing facility (SNF) coverage may encourage hospitalizations of residents with borderline indications for hospital admission. These perverse incentives to hospitalize residents may be strongest in nursing homes that depend heavily on Medicare SNF payments for revenue. In addition, under certain circumstances, nursing homes receive higher Medicare reimbursements for patients with active pressure ulcers than those without ulcers or with healed ones (since patients with ulcers are more costly to treat). Another respondent told us that the risk of hefty state fines for residents suffering falls and injuries, and the threat of lawsuits by families of residents who fall, may make nursing home administrators reluctant to reduce the number of physical restraints. Respondents also mentioned that many families tend to resist removal of physical restraints, particularly bed rails.
- **Focused attention on state survey process.** The fact that nursing homes are necessarily focused on satisfying state regulators and place highest priority on correcting any state survey deficiencies can divert their attention away from the pressure ulcers and physical restraint themes, especially since these two measures may not be the ones most important in the state survey process.
- **Lack of “systems” mentality.** Nursing home theme leader respondents reported that nursing homes often lack a “systems” mentality, with staff feeling as though QI efforts dictate what they should do, which they do not like: “They have a QA [quality assurance] rather than a QI mindset.” This lack of systems or QI thinking meant that a facility’s success or failure in improving rates of pressure ulcers and physical restraints often depended on the leadership and enthusiasm of one individual (such as the director of nursing). In one case, for example, the analysis identified the root cause of poor performance as an ineffective director of nursing. However, the administrator did not want to remove the individual because she was willing to come in and work nights and weekends.

### 3. Physician Offices

Finally QIO and physician practice staff described several major barriers to quality improvement in physicians’ office:



- **Lack of incentives and financial constraints.** One respondent noted, “The fee-for-service structure does not fit with providing all the preventive services and engaging with patients and doing the screenings.” Others reported that low Medicaid reimbursements were harming practices’ financial status. One state had reportedly not increased Medicaid payments in 10 years, leading to a 40 percent differential between Medicaid and Medicare payments. Another state was implementing cuts to Medicaid payments. Financial constraints likely limited practices’ ability to upgrade their EMRs and to hire additional staff for QI projects.
- **Lack of time.** Respondents remarked on the lack of time during typical primary care office visits for the clinician to address both the main reasons for the visit and all relevant preventive services topics, as well the overall lack of time for physicians and their staff during the week to deal with any issues beyond immediate patient care issues. A representative of a physician primary care specialty association explained that due to financial pressures (particularly from Medicaid, in that state), physicians have increased the size of their patient panels in order to maintain revenue. With larger patient panels, more visits are now squeezed into the workweek.
- **Difficulty changing provider behavior.** Respondents noted that it is human nature to resist change, and that even when people are not actually resistant to change, they tend to make changes slowly.
- **Too many quality initiatives and measures.** Responses included, “There are multiple new initiatives, which are not aligned,” and “There seem to be shifting priorities onto different QI measures.”
- **Patient noncompliance.** One practice specifically mentioned that patients do not see a colonoscopy as an important test; patients think they are somehow immune to colon cancer.

### **III. QIO SERVICES PROVIDED AND ENGAGEMENT OF PROVIDERS**

Results from a survey of QIO theme leaders indicate that QIOs provide an array of types of technical assistance services including individual provider assistance, learning collaboratives, group education, and dissemination of QI tools (Table III.1). Many QIO activities include multiple service categories of the types below. For example, one hospital described a QIO-delivered webinar series to support the implementation of a new tool. Participants were encouraged to share challenges and successes, and facilitators helped them troubleshoot specific problems. The webinar series thus included individual assistance, collaborative learning, and group education.

Beyond the QIOs' specific services, many providers seemed to hold favorable general perceptions of their QIOs that may have facilitated the activities. In numerous site visit interviews, across multiple themes, providers of all types expressed their appreciation of the QIO as a resource for expertise and a "fresh perspective" on current quality improvement issues.

Although recruitment of providers to engage with the QIO was often challenging as noted in Chapter II, Section B, most providers who agreed to participate in QIO initiatives actively participated, with at least two thirds participating throughout the 9th SOW in all but two themes (CKD and care transitions, only where 51 and 58 percent participated actively throughout, respectively). The number of providers involved with the QIO in each theme ranged widely by state, with some states working with only a handful of providers, while others worked with dozens and in some cases over 100 (Table III.2).

**Table III.1. Types of Services Provided by QIOs**

Type of Service	Prevalence as Major Component of QIO Work	Examples or Comments
Individual provider assistance	100%	“You need to get out one-on-one initially to build trust.” (physician practice)
Problem solving	100%	Discuss the specific cases of nursing home patients who were restrained, to find good alternatives
Discussing providers’ performance with them	96%	Review provider’s own data and identify patterns and point to potential solutions
Training staff in provider organizations	80%	Team STEPPS teamwork training (MRSA theme) Lean training QIO-developed curricula
Interacting with organizations’ top leadership	80%	Meetings with top administrative and clinical leadership
Making presentations on site	79%	QIO physicians present to a hospital’s physicians to encourage their buy-in to the initiative
Learning collaboratives	85%	Used for care transitions theme to convene providers within a community; used less for prevention theme to convene physicians or practice staff
Provider-specific feedback and benchmark data	82%	Quarterly feedback reports to targeted providers, with graphics and comparisons
Group education	81%	Webinars In-person educational meetings Notifying providers of QI educational opportunities sponsored by others Newsletter/listserv with QI tips
Development and dissemination of QI tools	76%	Pocket cards for surgeons with appropriate antibiotics for specific surgical procedures (SCIP/HF theme) Educational posters for patients regarding dangers of drug interactions for those taking Warfarin (drug safety theme)
Direct assistance to beneficiaries	n.a.*	Diabetes self-management education (prevention disparities theme) Print education materials distributed to physician practices to provide to beneficiaries (CKD and prevention disparities themes)
Community-level assistance	n.a.*	Convening a variety of types of providers and other health care organizations (such as provider associations and county health departments) to reduce readmissions in the community (care transitions theme)
Quality improvement support at the regional and state level	n.a.*	Partnering with a hospital or nursing home association to provide a QI conference Maintaining a high-functioning online QI resource open to all providers

Source: Survey of QIO Theme Leaders

\*These were less common and therefore not specifically asked about in the QIO survey.

**Table III.2. Provider Participation, by Theme**

Theme <sup>a</sup>	Number of States <sup>b</sup>	Mean Number of Providers Working with QIO Per State (Min.–Max.)	Mean Percent of Originally Included Providers Actively Involved Throughout 9th SOW	Estimated Percentage that Never Participated Very Actively <sup>d</sup>
SCIP/HF (hospitals)	53	13 (1–80)	76	2
MRSA (hospitals)	53	9 (1–59)	81	4
Pressure ulcers (nursing homes)	53	28 (2–124)	71	3
Physical restraints (nursing homes)	53	30 (1–130)	69	4
Core prevention (physician practices)	53	38 (4–171)	78	4
Prevention disparities (physician practices)	6	90 (5–179)	66	6
CKD (physicians, dialysis centers, hospital outpatient departments)	11	157 (5–450)	51	10 <sup>e</sup>
Care transitions (hospitals, nursing homes, and other providers)	14 <sup>c</sup>	43 (13–170)	58	26 <sup>f</sup>

<sup>a</sup>NHIN and drug safety theme data are not presented, as the surveys for those themes did not include a question about participation. QIOs generally worked with one nursing home each year on the NHIN theme.

<sup>b</sup>Includes territories and the District of Columbia.

<sup>c</sup>Communities rather than states.

<sup>d</sup>Mean of percentage reported by the QIO theme leaders, unless otherwise noted.

<sup>e</sup>Estimate from calls made by the evaluation team to listed providers in eight states. Estimate is conservative since only calls that reached the intended participant were included in the denominator.

<sup>f</sup>Estimate from QIO theme leaders' categorization of providers on their lists in eight states. Excludes providers not ranked by the theme leaders.

## IV. QIOS' EXPERIENCES OF THE 9TH SOW CONTRACT AND CMS PROGRAM SUPPORT

This chapter describes QIOs' experiences with the contract, reporting requirements, QIOSCs, and data support provided to all QIOs. This information enhances our understanding of how the program operated, and informs our later recommendations. The main data sources for this chapter are the QIO director and theme leader surveys, supplemented, where possible, by information from site visit interviews with QIO staff and key stakeholders. Table C.1 in the Volume II Appendix provides the percentage of theme leaders for each theme responding positively to each individual item included in the analysis below.

### A. Strengths

Table IV.1 summarizes the items from the theme leader survey with favorable responses, where we define favorable stringently as at least 90 percent of respondents giving a favorable rating, a relatively high threshold. The themes with the most favorable experiences were care transitions (14 of 42 possible items identified favorably) and physical restraints (12 of 42 possible items were identified favorably).

**Generally clear communications.** Clarity of communications was also rated favorably. Although the physical restraint theme had the highest number of items meeting our stringent definition of favorable (at least 90 percent of respondents with favorable ratings), more than 80 percent of respondents reported that for all themes, oral communications by CMS personnel were clear, that project officers understood the QIOs' interventions, that different CMS personnel provided consistent information, and that policy and notification memoranda issued by CMS were clear. The weak item in this category was the contract language at the time of award, which 35 percent of all theme leaders found to be unclear.

**Overall Satisfaction with Support from Project Officers and Functional Reporting System.** With respect to support from CMS staff and system, theme leaders reported high satisfaction with support from their project officer (90 percent said he/she was supportive and helpful), and that the PATRIOT reporting system worked well after the first six months.<sup>5</sup>

**Sufficient Information.** Sufficient data and information—for understanding the problem the intervention is designed to address, enabling design of interventions with high likelihood of success, and identifying interventions that are working elsewhere—were generally available, according to the theme leaders. The exception was that fewer than 65 percent of theme leaders for four themes (physical restraints, SCIP, MRSA, and core prevention) reported having sufficient data to identify racial/ethnic disparities.

### B. Potential Problem Areas

Table IV.2 summarizes potential problem areas by topic and theme, that is, the number of items in each topic for which fewer than 65 percent of theme leaders responded favorably. The

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<sup>5</sup> PATRIOT is Program and Theme Reporting Information Online Tool, the secure web-based reporting tool for the QIO Program.

**Table IV.1. Number of Items with 90 Percent or More Favorable Responses, by Topic and Theme**

Theme	(A) Clarity of Communications (of 9 items)	(B) Resources, Burden, and Flexibility (of 5 items)	(C) Support from CMS Staff and System (of 7 items)	(D) Sufficiency of Data and Information (of 5 items)	(E) Supportive Tools and Resources (of 11 items)	(F) Meaningful Contract and Reporting Focus (of 5 items)	(G) Total (Sum of Number of Favorable Areas Identified in Columns A-F)
SCIP (n = 48)	1	0	2	2	0	1	6
Pressure Ulcers (n = 51)	3	0	2	1		1	7
Physical Restraints (n = 47)	6	0	1	3	0	2	12
MRSA (n = 52)	3	1	2	0	0	0	6
Drug Safety (n = 50)	0	1	2	n.a.	n.a.	0	3
Nursing Homes in Need (n = 47)	1	0	1	n.a.	n.a.	0	2
Core Prevention (n = 52)	2	0	1	2	0	0	5
Prevention – Disparities (n = 6)	0	1	3	1	0	0	5
CKD (n = 11)	1	0	3	1	1	0	6
Care Transitions (n = 13)	3	0	1	4	5	1	14

themes facing the most challenges were CKD, prevention disparities, NHIN, and SCIP/HF (with 13 to 22 of 42 items identified as potential problem areas).

**Table IV.2. Number of Potential Problem Area Items, by Topic and Theme**

Theme	Clarity of Communications (of 9 items)	Resources, Burden, and Flexibility (of 5 items)	Support from CMS Staff and System (of 7 items)	Sufficiency of Data and Information (of 5 items)	Supportive Tools and Resources (of 11 items)	Meaningful Contract and Reporting Focus (of 5 items)	Total (42 items)
SCIP	1	4	1	1	2	4	13
Pressure Ulcers	0	3	1	0	3	2	9
Physical Restraints	0	1	1	1	3	2	8
MRSA	1	0	3	1	4	3	12
Drug Safety	4	0	2	NA	NA	3	9
Nursing Homes in Need	5	3	3	NA	NA	4	15
Core Prevention	1	0	3	1	1	3	9
Prevention – Disparities	6	2	1	0	8	3	20
CKD	5	5	1	3	4	4	22
Care Transitions	3	4	1	0	0	1	9

**Reporting Burden and Contract Timeframe.** Issues around resources, burden, and flexibility were significant, with an average of 2 of 5 items identified as potential problem areas. QIOs perceived that reporting and documentation requirements were often excessive, and the timeframe for meeting targets was often too short. Theme leaders for several themes (pressure ulcers, SCIP, NHIN, and CKD) also found that contract modifications required a great deal of effort to implement. Many theme leaders specifically took issue with the amount of reporting to CMS required by the contract. Only 62 percent of respondents found the amount of reporting to be reasonable. During site visits, QIO staff reinforced the survey results, describing reporting as excessive and burdensome, and diverting staff away from quality improvement work with providers.

Theme leaders for care transitions, prevention disparities, and CKD themes, all subnational themes, viewed the volume of documentation and reporting required as especially onerous, with only 15, 17, and 27 percent of respondents, respectively, agreeing that it was reasonable. It may be that CMS wanted more detailed information on these subnational themes to inform decisions on expanding them nationally. During a site visit, a prevention disparities theme leader noted that staff spent 80 hours each month on required reporting for the theme. QIO staff for the core prevention theme in several states said that the required monthly reports “didn’t allow time for improvements to take place,” and placed too great a burden on providers.

**Feasibility Issues with Ambitious Targets and Timelines.** The more challenging nature of the targets and timeframes for CKD and care transitions themes were apparent in the fact that only 15 percent of care transitions theme leaders believed that the targets set by the contract were attainable, and no care transitions respondents felt that the timeframe to achieve those targets

was reasonable. Similarly, only nine percent of CKD theme leaders thought that their targets were reasonable, and nine percent felt that they could be achieved in the given timeframe. These themes' goals were particularly challenging because they targeted either outcomes of care (hospital readmissions for care transitions) or measure rates for entire states (CKD). While generally much more meaningful than process-of-care measures, outcomes of care are more difficult to influence than the process measures that are the focus of other themes. Similarly, measure rates for an entire state, while more meaningful than rates for a small group of PPs, are much more challenging to influence than rates for a small set of providers receiving individual attention from the QIO (as in other themes).

**Knowledge Base of Government Task and Theme Leaders.** Although theme leaders reported high overall satisfaction with their project officers' helpfulness, support, and knowledge base, only 61 and 64 percent believed their government task and theme leaders had a good or excellent knowledge base relative to their responsibilities. This assessment varied by theme, with the most favorable themes being prevention disparities and CKD, with 90 to 100 percent of these theme leaders rating their government theme leader's knowledge base as good or excellent. Conversely, over a third of theme leaders reported that their government task and theme leaders had fair or poor knowledge relative to their responsibilities (39 percent and 36 percent, respectively).

**Mixed Views on Tools and Resources.** On the positive side, 80 percent of all theme leaders found available tools and resources to be of high quality. More specifically, certain tools and resources available from QIOSCs were valued by the majority of theme leaders, such as QIOSC-convened conference calls and QIOSC-provided tools (75 percent and 71 percent of theme leaders agreed that these two contributions were of moderate to high value). However, substantially fewer theme leaders (57 percent) agreed that data analysis reports from the QIOSCs were at least of moderate to high value, and only 66 percent found the data provided to the QIOs for their own use to be valuable.

The perceived value of QIOSC-provided resources varied greatly by theme. While all care transitions theme leaders (100 percent) agreed that QIOSC-generated reports containing data analysis were of moderate to high value, fewer CKD and prevention disparities theme leaders attributed the same value to the reports (only 36 percent and 17 percent agreed that QIOSC reports were of moderate to high value, respectively). Responses from the QIO Director Survey and site visit interviews echoed these points. When commenting about the QIOSCs, 13 percent of QIO directors described a wide variation in performance and some singled out the prevention disparities QIOSC as specifically needing improvement. One of two prevention disparities theme leaders we visited said that the theme's QIOSC "provided little information" and "lacked guidance." On the other hand, four of six visited care transitions theme leaders found this theme's QIOSC to be "responsive," "supportive," and "extremely good."

Many theme leaders reported that tools and resources were not available when they were needed, a factor which may have diminished their value (62 percent said they were available when needed). For example, three of eight visited core prevention theme leaders observed that QIOSC materials arrived "too late for us to really use." Theme leaders for CKD and MRSA made similar comments in their surveys.

**Data Time Lags and Recall Issues.** In addition to the tools and resources provided by the QIOSCs, various QIO data contractors were to provide each QIO with data they could analyze



themselves to help target and adjust interventions and monitor progress. Only 66 percent of all theme leaders found moderate to high value in this data. The time lag in available data was an issue raised by six of eight visited QIOs. As one QIO director explained, "Old data doesn't work. Old data will not move a physician to change." Another director commented that the data lags made it difficult for them to improve on interventions. Two theme leaders described their efforts to work around the problem by collecting more timely data directly from providers, allowing them to prepare snapshots of providers' performance that they could not get from the QIO data support contractor.

Furthermore, some data released to the QIOs by the data support contractor later had to be recalled because of inaccuracies. A number of QIO directors (13 percent) noted that these data recalls caused QIOs to lose time and resources. One QIO staff member described how corrections to data were frequently necessary, with each correction taking two to three weeks to complete. The cumulative effects of these corrections worsened data lags over time and exacerbated time pressures when the data were needed to develop reports required by CMS.

**Meaningful Focus of Improvement Targets and Required Reporting.** Overall, the survey items asking about whether the QIO 9th SOW had a meaningful contract and reporting focus showed weakness. While 83 percent of all theme leaders agreed that the contract focused on important areas of quality, QIO theme leaders often questioned whether the providers on which the theme focused, improvement targets, and required reporting achieved a meaningful focus. Only 58 percent agreed that the improvement targets represented meaningful improvements in care, and only 64 percent agreed that the contract focused on providers whose improvements will have substantial impact on quality in the state. In the interviews, some noted the example of the core prevention theme, in which any improvements in measures could easily reflect more thorough documentation rather than better care. Interviewees also questioned the added value and purpose of the reporting: one theme leader compared reporting in PATRIOT to putting information "into a black hole" and wondered if PATRIOT reporting could instead be used as a basis for more feedback from CMS.

## V. EFFECTIVENESS OF THE QIO PROGRAM

Having provided an overview of the QI environment faced by QIOs, the services they provide, and their experiences with the 9th SOW contract in Chapters II through IV, we move on to a theme-by-theme presentation of evaluation findings.

In this chapter we discuss and synthesize, by theme, our two main methods of assessing each theme:

- Program effectiveness as reported by managers of QIOs, other QI organizations, physician practices, hospitals, and nursing homes, based on survey and site visit interviews.
- Program impacts estimated by comparing providers who receive QIO services (the intervention group, also called PPs) to a “statistically equivalent” group of providers who did not (or NPs), based on CMS and QIO administrative data. As noted in Volume II, Chapter II, the design of some themes did not permit the creation of a statistically equivalent group of NPs. Specifically, we estimated impacts for (1) SCIP/HF, (2) physical restraints and pressure ulcers, (3) CKD, and (4) care transitions.

Table V.1 summarizes the statistical approaches used to estimate each program impact presented in this chapter (further details are in Volume II, Chapter II).

**Table V.1. Analytic Approaches Used to Estimate Impacts for QIO 9th SOW Themes**

Theme	Analytic Approach	Location of Methods Description
Patient Safety SCIP/HF Physical restraints Pressure ulcers	Regression discontinuity	Volume II, Chapter II, Section A
Care Transitions and CKD Selection of comparison group	Propensity score matching(county level)	Volume II, Chapter II, Section B
Impact estimation	Difference-in-difference regression analysis(patient level)	

For the themes listed in the table above, we also performed supplemental statistical subgroup analyses to explore the following questions:

1. Are certain QIO approaches to technical assistance more effective than others?
2. Does the overall QI environment affect QIO effectiveness?
3. Are QIO interventions more or less effective for certain types of providers?

We briefly describe the methods for these three sets of subgroup analyses below, and additional details may be found in Volume II Chapter II, Sections E and F.

**Are Certain QIO Approaches More Effective Than Others?** We divided the QIOs into subgroups according to various “bundles” of activities they pursued using two approaches: (1) a cluster analysis approach (a purely statistical approach) that analyzed composite scores developed from the QIO theme leader surveys, and (2) an application of field knowledge approach, in which we operationalized information learned from our site visits to QIOs from items in the theme leaders survey.

For the cluster analysis, we developed three composite scores—(1) collaboration, (2) individual activities, and (3) group approaches—based on QIO activities with providers as reported in the QIO theme leader survey. Since QIOs pursued different activities for different themes, the scores differed by theme. The cluster analysis empirically divided the QIOs by their score levels into mutually exclusive groups (Table V.2) which we later named “low,” “medium,” and “high.” We did not perform this analysis in the CKD theme, which involved QIOs fostering a variety of statewide partnerships but did not involve QIOs providing technical assistance to individual providers.

**Table V.2. Analysis of Relative Effectiveness of QIO Approaches—Grouping of QIOs by Cluster Analysis of Composite Scores in Collaboration, Individual Activities, and Group Approaches, by Theme**

Theme	Collaboration Score (C)	Individual Activities Score (I)	Group Approaches Score (G)	Abbreviation
SCIP/HF (three subgroups)				
SCIP Cluster 1	High	High	High	High C—High I—High G
SCIP Cluster 2	High	High	Low	High C—High I—Low G
SCIP Cluster 3	Low	High	High	Low C—High I—High G
Physical Restraints (two subgroups)				
PR Cluster 1	High	High	High	High C—High I—High G
PR Cluster 2	Low	High	Medium	Low C—High I—Medium G
Pressure Ulcers (three subgroups)				
PU Cluster 1	High	High	High	High C—High I—High G
PU Cluster 2	High	High	Medium	High C—High I—Medium G
PU Cluster 3	Low	High	Low	Low C—High I—Low G
Care Transitions (two subgroups)				
CT Cluster 1	High	High	High	High C—High I—High G
CT Cluster 2	Medium	High	Low	Medium C—High I—Low G

For the application of field knowledge approach, we merely divided QIOs by whether or not theme leaders reported doing an activity (or combinations of two activities) for the selected

themes analyzed. Thus, each analysis compared two mutually exclusive subgroups of QIOs that either did or did not engage in certain activities for a specific theme as follows:

- SCIP/HF
  - QIOs that used all of six approaches,<sup>6</sup> versus those that did not use all six
  - QIOs that formed new collaboratives and routinely provided providers with feedback data and benchmarks versus those that did not do these activities
- Pressure ulcers
  - QIOs that discussed providers' performance with them, and trained their staff, and routinely provided providers with feedback data and benchmarks, versus those that did not do these activities
  - QIOs that worked with a majority of providers they had previously worked with versus those that did not
- Care transitions
  - QIOs that worked with a majority of providers they had previously worked with versus those that did not

Our site visit interview data did not yield any obvious subgroups for the physical restraints theme, and as mentioned earlier, this analysis of different QIO strategies of working individual providers did not apply to the statewide CKD theme.

In both the cluster analysis and application of field knowledge approaches, we estimated the impacts (that is, the difference between the intervention and comparison groups) within each subgroup, and tested whether the separate subgroup impact estimates were statistically different from each other. For example, for the pressure ulcer theme, in the cluster analysis approach, we tested whether the impacts achieved by QIOs in the physical restraints Cluster 1 (characterized by high collaboration, high individual activities, and high group approaches scores) were statistically different than impacts achieved by QIOs in Cluster 2 (characterized by low collaboration, high individual activities, and medium group approaches scores). Similarly, for SCIP/HF in the application of field knowledge approach, we tested whether the impacts achieved by QIOs that formed new collaboratives and routinely furnished providers with feedback data and benchmarks were statistically different from those that did not do these two activities.

**Does the Overall QI Environment Affect QIO Effectiveness?** For this question, we divided the QIOs into two subgroups: (1) those whose theme leaders who perceived that the QIO operated in an environment supportive of QI ("supportive environment") and (2) those whose theme leaders who did not have this perception. We estimated impacts within each subgroup, and tested whether impacts for QIOs in supportive environments were statistically different from nonsupportive environments.

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<sup>6</sup> That is, they (1) formed new collaboratives, (2) helped individual providers with problem solving, (3) made presentations onsite to providers, (4) helped providers use their own information systems more effectively, (5) provided one-to-many (group) education, and (6) routinely provided providers with feedback data and benchmarks.

**Are QIO Interventions More or Less Effective for Certain Types of Providers?** Lastly, we divided providers into subgroups (rather than QIOs, as in the previous two questions) by selected characteristics such as by size or for-profit/not for-profit status, and assessed whether the impacts of the QIOs were statistically different for providers with and without these characteristics.

## **A. Hospitals: SCIP/HF**

### **1. Survey and Site Visit Results**

Many more hospitals reported working with their QIO on SCIP issues than were official PPs for the QIO. Specifically, 564 surveyed hospitals reported that they were participating with their state's QIO (which was identified by name in the survey) on a quality initiative related to SCIP or HF. However, according to recruitment data uploaded by each QIO into PATRIOT, only 255 of these hospitals were officially participating in the theme. It may be that many hospitals that were not official SCIP/HF PPs still received other assistance or participated in sponsored activities from their QIO. The hospital QI directors responding to our survey then interpreted these events to indicate "participation" with the QIO. Specifically, this might have occurred because:

- Hospitals received help from their QIO on RHQDAPU
- Hospitals received general advice or assistance from their QIO since QIOs are required to provide help when requested to by any provider, whether or not a PP
- Hospital staff attended QIO-sponsored events or received QI tools from the QIO

To the extent that these QIO activities helped all hospitals, including NPs, to improve quality, the power of the impact analysis to detect differences between PPs and NPs would be diminished. In our analyses, we relied on the hospital's report on whether they were participating with the QIO on the SCIP/HF theme to categorize hospitals as PPs or NPs.

In the survey, almost 9 out of 10 hospitals perceived an impact from working with a QIO. Eighty-eight percent of the self-identified SCIP/HF participant hospitals said meetings with the QIO or educational materials and tools provided by the QIO led to changes in the hospital that ultimately improved care. The great majority of these respondents identified a specific measure or measures that they said improved as a result of these contacts: 32 to 39 percent of the self-identified SCIP/HF participants reported QIO-influenced improvements in five of the SCIP/HF measures, and another 18 and 29 percent of respondents reported improvements on the other four SCIP measures as a result of the QIO contacts (see Figure C.12 in the Appendix of Volume II for the list of measures). In addition, 80 percent of the SCIP/HF participants said they received data feedback on their performance from the QIO, and among these, 91 percent said it had been important to their hospitals' QI efforts.

In several of our site visits, one or both of the visited hospitals pointed to specific improvements in their quality measures that they credited at least in part to QIO assistance. Usually the improvements were in the care processes that are measured by the first four SCIP/HF measures (such as VTE prevention, antibiotic timing, and the heart failure discharge process).

There was also evidence, however, of QIOs having had little effect. There were several instances of hospitals that were on the J-17 list at the start of the 9th SOW that had improved their performance (sometimes dramatically) through other non-QIO QI resources, so that by the time they were approached by their QIOs to participate, they no longer needed assistance. In our survey, SCIP/HF participating and nonparticipating hospitals were equally likely to report the presence of internal efforts focused on improving specific SCIP/HF measures (over 85 percent of hospitals for most measures).

## 2. Impact Estimates

QIOs recruited 607 hospitals to participate in the SCIP/HF theme. We first examine what the quality levels of PPs and NPs were during the baseline period preceding the 9th SOW (the period July 2007 through June 2008), and how those levels changed between baseline and Q2 2010, the most recent period for which data were available for this report. Finally, we present estimates of QIOs' impacts on PPs in the SCIP/HF theme through the Q2 2010 data period from the regression discontinuity analyses (see Table V.4).

**Trends in Quality Measures.** We first present trends in five measures in the SCIP/HF theme to provide a descriptive context of the changes that occurred over the 9th SOW. These descriptive trends do not represent valid estimates of QIOs' impacts, however. Three of the five measures are original individual SCIP/HF measures (hair removal, LVSD ACEI/ARB, and beta-blocker continuation), and two are composites of individual measures (perioperative antibiotic use and VTE prevention). Table V.3 shows average baseline and followup rates and changes in these quality outcomes for providers that QIOs worked with in the SCIP/HF theme (PPs) and other providers, separately (NPs). For the four measures for which baseline data are available, PPs started with lower average quality levels at baseline, in comparison to NPs. This is to be expected given that PPs were predominantly drawn from the J-17 list, which was composed of providers with lower pre-SOW quality levels.<sup>7</sup> Those PP hospitals also tended to experience greater improvement than NPs. Of course, PPs had greater room for improvement because they started from a lower baseline rate. The subset of NPs that were on the J-17 list—and thus too had lower baseline quality levels—also experienced larger average improvement in quality relative to NPs as a whole. Baseline data are not available for the beta-blocker continuation variable, so it is not possible to assess change over time. At followup, PPs had compliance rates similar to those of NPs, and substantially higher than the rates of the subset of providers that were on the J-17 list, but not selected as PPs.

**Visual Analysis.** We created a plot for each outcome measure in the SCIP/HF theme. The plots show the hospitals' values of the outcome measure on the vertical axis and baseline values of the "forcing variable," the measure that determined placement on the J-17 list, on the horizontal axis. (Volume II, Chapter II, Section A describes how hospitals were first grouped into "bins" and average values of the outcome variable were calculated for each bin).

For example, Figure V.1 shows the plot for the VTE prevention composite outcome measure, which is a simple average of VTE-1 and VTE-2, the two SCIP measures of recommended steps for preventing post-operative venous thromboembolism (VTE). Linear

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<sup>7</sup> Specifically, lower levels on two items gauging appropriate antibiotic provision before and after surgery (SCIP Inf-1 and SCIP Inf-3).

**Table V.3 SCIP/HF Theme: Change in Targeted Outcomes Between Baseline (July 2007–June 2008) and Followup (June 2009–July 2010)**

Quality Measure	PP	All NPs	NPs on, J-17 Target List
<b>Perioperative antibiotic use<sup>a</sup></b>			
Baseline (%) (SD)	82.7 (10.7)	90.2 (7.8)***	81.2 (11.7)**
Followup (%) (SD)	94.4 (6.1)	95.0 (5.9)**	90.8 (10.8)***
Change (SD)	11.7 (9.8)	4.7 (6.1)***	9.6 (9.6)***
(SD)	(9.8)	(6.1)	(9.6)
N	581	2,709	320
<b>Hair Removal<sup>d</sup></b>			
Baseline (%) (SD)	94.9 (11.7)	96.5 (8.8)***	93.6 (12.4)
Followup (%) (SD)	99.3 (4.6)	99.2 (4.0)	97.9 (7.8)***
Change (SD)	4.4 (10.6)	2.7 (8.1)***	4.3 (10.2)
N	577	2,704	323
<b>LVSD ACEI/ARB<sup>e</sup></b>			
Baseline (%) (SD)	88.0 (11.4)	90.3 (10.9)***	87.4 (13.0)
Followup (%) (SD)	92.4 (10.4)	93.3 (9.8)***	91.6 (10.2)
Change (SD)	4.4 (12.3)	2.9 (11.0)***	4.2 (12.9)
N	562	2,624	314
<b>VTE Prevention<sup>f</sup></b>			
Baseline (%) (SD)	80.4 (16.2)	85.9 (13.6)***	77.8 (19.7)**
Followup (%) (SD)	90.3 (10.8)	91.0 (11.8)	85.9 (18.5)***
Change (SD)	9.9 (14.8)	5.1 (12.6)***	8.2 (17.7)
N	577	2,679	317
<b>Beta-Blocker<sup>g</sup> Continuation</b>			
Followup (%) (SD)	89.7 (13.0)	90.4 (13.2)	85.8 (19.8)***
N <sup>h</sup>	558	2,585	314

Sources: Data for baseline and followup quality measures from Hospital Compare. Target list status provided by the Oklahoma Foundation for Medical Quality.

Note: Please see Table ES.2 for more detailed definitions of these measures. Hospitals on the J-17 target list are those with low performance on a measure of appropriate surgical care in Q4 2006 and Q1 2007. PPs=participating providers, hospitals successfully recruited by QIOs to participate in the SCIP/HF patient safety theme; NPs=nonparticipating providers; ACEI=angiotensin converting enzyme inhibitor; ARB=angiotensin receptor blocker; LVSD=left ventricular systolic dysfunction; SD=standard deviation; VTE=venous thromboembolism. N=number of observations (hospitals). Sample includes only hospitals reporting data at both baseline and followup..

<sup>a</sup> Composite measure: simple average of three items (1) prophylactic antibiotic received on time prior to surgery (Inf-1); (2) receipt of the prophylactic antibiotic recommended for the specific surgical procedure (Inf-2); and (3) prophylactic antibiotics discontinued within 24 hours after end of surgery (Inf-3).

<sup>b</sup> Composite measure: simple average of two items: (1) surgery patients with recommended VTE prophylaxis ordered (VTE-1); (2) surgery patients who received appropriate VTE prophylaxis within 24 hours before surgery to 24 hours after surgery (VTE-2).

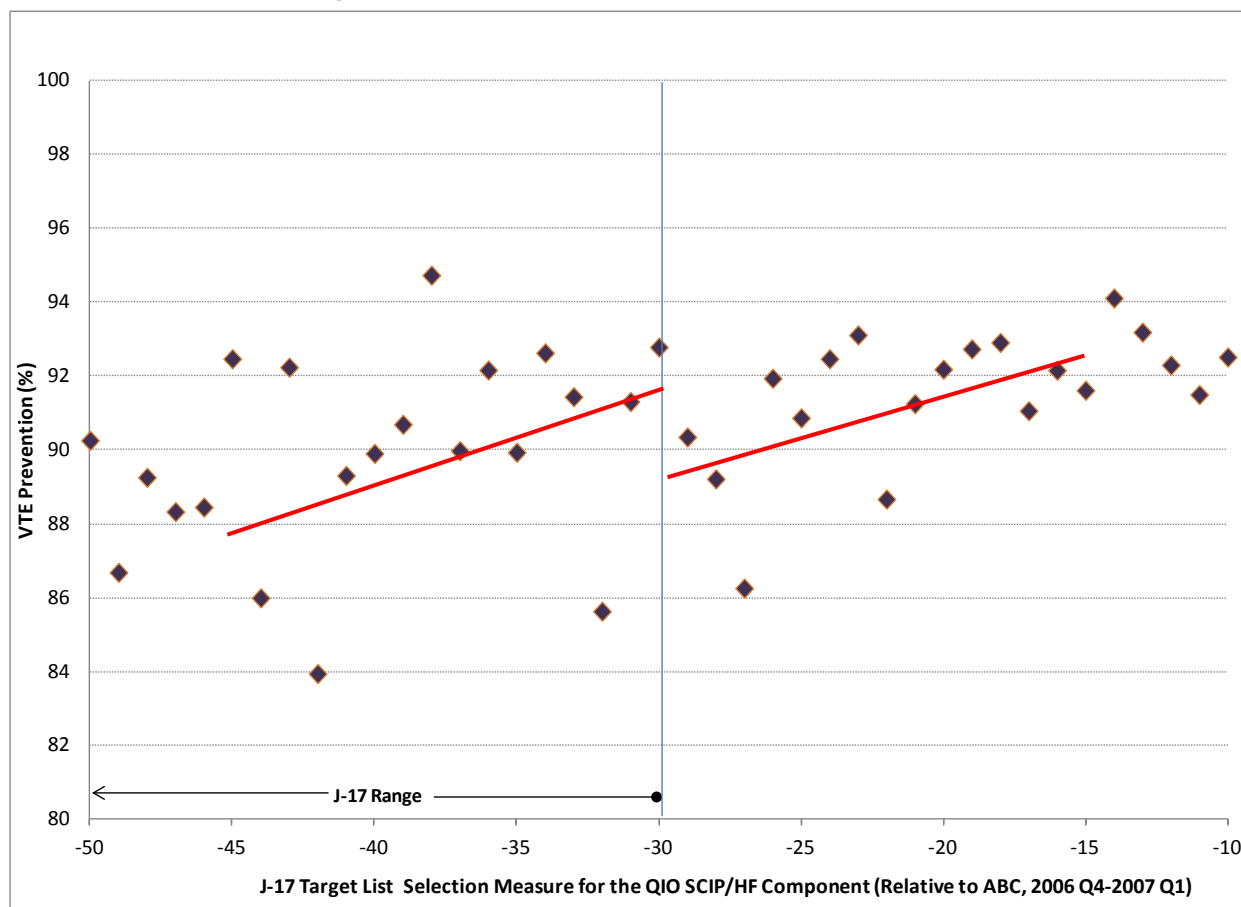
\*Significantly different from PP mean at the .10 level, two-tailed test.

\*\*Significantly different from PP mean at the .05 level, two-tailed test.

\*\*\*Significantly different from PP mean at the .01 level, two-tailed test.

trend lines are plotted through the data points on each side of the selection threshold. The plot suggests a favorable impact of the QIO program. Most of the data points just to the left of the J-17, which represent providers much more likely to have participated with QIOs, are higher than would be expected given the trend for the data points to the right of the threshold. The pattern of data points trends upward at similar slopes on each side of the selection threshold, but the level on the VTE prevention measure shifts up about two percentage points (as shown by the trend

**Figure V.1. SCIP/HF Theme: Plot of Average Followup VTE Prevention Composite Outcome Measure, by Pre-SOW Forcing Variable Values**



Sources: Followup (July 2009–June 2010) quality measures are from Hospital Compare. Forcing variable values are taken from a data file provided by the Oklahoma Foundation for Medical Quality.

Note: The VTE prevention composite outcome measure is a simple average of the two SCIP measures for recommended prevention of post-operative VTE, VTE-1 and VTE-2.

The forcing variable, which is an average of SCIP measures Inf-1 and Inf-3, is the measure that determined whether a hospital was on the J-17 target list. Hospitals were placed on the list if their measure was 30 points or more below a threshold value called the Achievable Benchmark of Care (ABC) during both Q4 of 2006 and Q1 of 2007 (the calculation of the ABC is described in Weissman et al. [2001]). The forcing variable is the hospital's lowest of the two scores (relative to the ABC) for those quarters. Each data point represents the average followup outcome measure for all providers within a one percentage point-wide "bin" of the pre-SOW forcing variable (see Volume II, Chapter II, Section A). The vertical blue line is the selection threshold dividing J-17 hospitals from non-J-17 hospitals. Data in the chart are for a total of 1,898 hospitals (590 J-17, 1,308 non-J-17) whose forcing variables fall between -50 and -10 relative to the ABC.

lines plotted through the data) for providers on the J-17 selection list. Appendix C of Volume II contains the plots for the remaining SCIP-HF outcomes.

**Statistical Analysis.** As described in Volume II, Chapter II, Section A, a regression discontinuity analysis typically involves limiting the sample to observations with values of the forcing variable within a range (called the "bandwidth"). This bandwidth is chosen to be narrow enough around the selection threshold to minimize bias yet wide enough to keep enough observations to maintain statistical precision. Our primary bandwidth is  $\pm 15$  percentage points



around the selection threshold. Table V.4 presents impacts estimated with the primary bandwidth.

**Table V.4. SCIP/HF Theme: Estimated Impacts of QIO Work with PPs on Process-of-Care Outcomes**

	Perioperative antibiotic use <sup>a</sup>	Hair Removal <sup>b</sup>	LVSD ACEI/ARB <sup>c</sup>	VTE Prevention <sup>d</sup>	Beta-Blocker Continuation <sup>e</sup>
Estimated Impact (Standard error)	-0.36 (0.84)	0.68 (0.43)	1.24 (1.51)	3.74** (1.79)	4.03* (2.23)
Expected Average Without Intervention <sup>f</sup>	93.9	99.3	92.5	89.2	88.2
N	1,376	1,374	1,339	1,368	1,343

Sources: Data to create the baseline (July 2007–June 2008) and followup (July 2009–June 2010) quality measures are from Hospital Compare. Provider-level covariates are derived from Hospital Compare (March 2009 archive). County-level covariates are from the 2008 Area Resource File. Those covariate measures are listed in Table II.3 in Volume II, Chapter II, Section A .

Note: See Volume II, Chapter II, Section A for a full description of the methods used to estimate impacts. Results are produced using a two-stage least squares local linear or polynomial specification and reflect the estimated difference in the outcome for providers just above and below the J-17 selection threshold. Being on the J-17 list is used as an instrument for PP status. All hospitals are weighted equally. The models use a linear specification to capture the relationship between the forcing variable and the outcome. Tests using quadratic specifications found no statistically significant nonlinearities in that relationship. All specifications include several covariates ( Volume II, Chapter II, Section A). The models for all outcomes, other than the beta-blocker measure, also include baseline levels of the outcome (measured July 2007–June 2008). The sample is limited to providers with forcing variable scores within  $\pm 15$  percentage points of the selection threshold.

<sup>a</sup> This is a composite measure that is a simple average of the three SCIP items for proper perioperative antibiotic use, Inf-1 through Inf-3.

<sup>b</sup> Percent of patients with appropriate hair removal prior to surgery (SCIP Inf-6).

<sup>c</sup> Percent of cases in which HF patients with LVSD without ACEI and ARB contraindications are prescribed ACEI/ARB at discharge (HF-3)

<sup>d</sup> This is a composite measure that is a simple average of the two SCIP items for prevention of post-operative venous thromboembolism (VTE), VTE-1 and VTE-2.

<sup>e</sup> Percent of surgery patients on beta-blocker therapy prior to arrival who received a beta-blocker during the perioperative period (SCIP Card 2).

<sup>f</sup> Regression-based estimate of what the average rate of the outcome would have been among providers at the selection threshold had the intervention not occurred.

\*Significantly different from zero at the .10 level, two-tailed test.

\*\*Significantly different from zero at the .05 level, two-tailed test.

\*\*\* Significantly different from zero at the .01 level, two-tailed test.

N = number of observations (hospitals).

There is a significant favorable program impact on the VTE prevention measure of 3.7 percentage points ( $p < 0.05$ ). This is consistent with the visual evidence that showed about a two-percentage point shift in the trend line at the selection threshold in Figure V.1. Given that the probability of being a PP increased by about 50 percentage points at the threshold (rather than 100 percent), the size of the impact on those receiving services would have been roughly double that 2 percentage point difference—or about four percentage points.

There is also a favorable impact of 4.0 percentage points on proper continuation of beta-blocker receipt, although this was only significant at the  $p < 0.10$  level. Both of these estimates were robust to sensitivity tests using alternative bandwidths. There were no significant impacts on the other three measures.<sup>8</sup>

Providers did tend to improve on all quality measures during the course of the SOW (Table V.3), and the survey and site visit data suggested that hospitals made meaningful changes in SCIP/HF processes of care in response to QIO contacts. But results from the statistical analyses suggest that hospitals were able to improve even without the QIO. For at least two of the measures, however, QIOs' efforts led to notable improvements that would not have occurred otherwise. One of these two measures, VTE prevention, is one that QIOs have been working on for several years (extending back through earlier SOWs), whereas the other measure, beta-blocker continuation, is a newer measure.

### **Are Certain QIO Approaches in the SCIP/HF Theme More Effective Than Others?**

For the cluster analysis approach, we used the regression-discontinuity approach to estimate the impacts (intervention-comparison group differences) for each theme measure within each of the three subgroups listed above in Table V.2, namely SCIP Clusters 1 through 3, and then tested whether each of these subgroup impacts were statistically different from the others. The only notable results were for the VTE prevention outcome. For this outcome, the SCIP Cluster 3 (Low C–High I–High G) approach appeared more effective (achieved larger impacts) than the SCIP Cluster 1 (High C–High I–High G) approach, with estimated impacts of 12.8 versus 2.2 percentage points, respectively ( $p < 0.10$  for the difference in impacts). Also, the SCIP Cluster 3 (Low C–High I–High G) approach also appeared more effective (achieved larger impacts) than the SCIP Cluster 2 approach (High C–High I–Low G) approach, with estimated impacts of 12.8 versus 1.0 percentage points, respectively ( $p < 0.10$  for the difference in impacts). Detailed results are in Volume II, Chapter II, Section E. These results suggest that, at least for the VTE outcome, QIOs need not necessarily pursue activities in all three domains, and possibly that QIOs' collaborative approaches may be less important for hospitals, if other group learning approaches are strong. Alternatively, the QIO theme leaders' survey responses of the frequency and importance of various activities may not have completely captured what they were actually doing, and thus the composite scores based on those responses may also suffer from measurement error. We note that the statistical power of these subgroup analyses is quite limited. For example, across the SCIP/HF outcomes, many of the minimum detectable differences (at a 10 percent significance level) for differences in impacts between the SCIP clusters are in the 7 to 15 percentage point range (see Volume II, Chapter II, Section E).

Recall that for the application of field knowledge approach, there were two sets of subgroup comparisons: (1) QIOs that used all of six approaches, versus those that did not use all six, and (2) QIOs that formed new collaboratives and routinely provided providers with feedback data and benchmarks versus those that did not do these activities. Among the five SCIP study outcome measures, and the two subgroup analyses, there was only one marginally significant subgroup difference—in the use of perioperative antibiotics. This subgroup difference was a

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<sup>8</sup> The hair removal measure is topped out and thus it is not surprising that there are no impacts. For the LVSD care measure, the visual analysis suggested a possible favorable program effect, and one of the alternative analyses using the wider bandwidth yielded a marginally significant result, but these findings are not strong enough to conclude there was a program impact.

somewhat counterintuitive result as QIOs that used all six approaches had somewhat smaller impacts (the estimated impact was negative 5.7 percentage points) than QIOs that did not (the estimated impact was positive 1.1 percentage points;  $p < .10$  for the difference in impacts). It may be that QIOs that undertake too many approaches end up doing them less effectively than QIOs that pursue fewer approaches but with greater effectiveness. However, the other analyses were not statistically significant, meaning that for the other four outcomes, impacts achieved by QIOs using all six approaches were no different than impacts for QIOs not using all six approaches. Again, there may also be measurement error in how well the survey items measure what QIOs are actually doing. Furthermore, for all five outcomes, forming new collaboratives and routinely providing providers with feedback data and benchmarks did not result in impacts that were any different than not doing these two activities.

#### **Does the Overall QI Environment Affect QIO Effectiveness in the SCIP/HF Theme?**

There were some hints supporting the hypothesis that a supportive environment may lead to greater QIO effectiveness, at least for the perioperative antibiotic use and ACEI/ARB outcome measures in the SCIP/HF theme. For the perioperative measure, QIOs in states with a supportive environment had a larger estimated impact (positive 0.75 percentage points) than QIOs in states without such environments (negative 2.8 percentage points;  $p < .05$  for the difference in impacts). Similarly, for the ACEI/ARB measure, QIOs in states with a supportive environments had a larger estimated impact (positive 3.7 percentage points) than QIOs in states without such environments (negative 1.6 percentage points;  $p < .10$  for the difference in impacts).

**Are the QIO SCIP/HF Interventions More or Less Effective for Certain Types of Providers?** Based on our site visit interviews, we might expect that QIO assistance could be more important or effective for independent hospitals, which do not have a corporate network quality improvement department like system-owned hospitals. The evidence for this hypothesis was mixed, however. Results for the ACEI/ARB measure were as expected, namely that impacts were more favorable for independent hospitals (estimated impact of 5.3 percentage points) than for system hospitals (estimated impact of negative 0.7 percentage points;  $p < 0.10$  for the difference in impacts). In contrast, impacts on perioperative antibiotic use were more favorable for system-owned hospitals (estimated impact of 1.9 percentage points) than independent ones (negative 5.5 percentage points;  $p < 0.01$  for the difference in impacts).

We might also expect, because of less access to QI resources, that rural hospitals would benefit more from QIO efforts than urban hospitals. Again the evidence was mixed for the ACEI/ARB and perioperative antibiotic use measures. Results for ACEI/ARB were as hypothesized, namely that impacts were more favorable for rural hospitals (estimated impact of 7.2 percentage points) than for urban hospitals (estimated impact of negative 2.4 percentage points) ( $p < 0.01$  for the difference in impacts). However, impacts on perioperative antibiotic use were negligible for urban hospitals (estimated impact of negative 0.4 percentage points) and worse for rural hospitals (negative 6.9 percentage points) ( $p < 0.10$  for the difference in impacts).

These mixed results are inconclusive. It is possible that some of these statistically significant results are due to chance. With a 10 percent significance level, one would expect to see one out of 10 statistical tests to appear significant by chance alone. There may also be some overlap between urban and system-owned hospitals, and it may be both the urban and system hospitals were more receptive to QIO efforts on perioperative antibiotics, possibly related to a greater volume of surgeries at urban and system hospitals, or that surgeons or surgical practices affiliated with urban and system hospitals more able to adhere to guidelines for perioperative

antibiotics. On the other hand, rural and independent hospitals, compared to urban and system hospitals, may have been better able to take advantage of QIOs' assistance in the ACEI/ARB measure, again possibly related to differences in types and practices of physicians caring for heart failure patients.

## **B. Hospitals: Methicillin-Resistant Staphylococcus Aureus (MRSA)**

We present only survey and site visit results for the MRSA theme. As discussed earlier, this theme is among those for which an impact analysis was not done because it was not possible to create a comparison group that is statistically equivalent to the intervention group.

The QIOs we visited focused on assisting hospitals to report MRSA rates to the CDC's National Healthcare Safety Network, rather than on improving MRSA rates themselves. According to our interviews at one QIO and two of its participating hospitals, all the hospitals in that state are now reporting, thanks to a large training effort. Four of the eight QIOs that we visited had limited their outreach in the MRSA theme to fewer than seven hospitals. It is not surprising that only 15 and 16 percent, respectively, of self-identified MRSA theme participants in the hospital survey reported improving on MRSA infection and MRSA transmission rate (also known as measures MRSA1 and MRSA2 in the 9th SOW), at least in part as a result of QIO contacts. These self-reported rates of QIO-associated improvement are much lower than for the SCIP/HF theme. However, for the MRSA-1 infection rate, 91 percent of participants reported having internal QI efforts in place compared to 73 percent of nonparticipants, and for the MRSA-2 transmission rate, the proportions were 81 percent of participants versus 61 percent of nonparticipants. Perhaps contacts with QIOs do encourage hospitals to pursue QI efforts, even if respondents did not yet think those efforts had resulted in any MRSA rate changes. (Alternatively, hospitals that self-identify as working with the QIO are more likely to initiate QI activities.) Despite limited efforts on this theme, and the focus on increasing hospital reporting rather than QI itself, several QIOs commented that it was a useful experience given the growing attention to hospital acquired infections.

## **C. Nursing Home Physical Restraints and Pressure Ulcers**

### **1. Survey and Site Visit Results**

**Physical Restraints.** Among the QIOs we visited, the majority reported having a positive impact on physical restraint rates. The most common examples of positive changes include nursing homes that had implemented restraint-free policies, increased the use of alternatives to restraints, and improved the accuracy of restraint coding. In our nationally representative survey of nursing homes, 84 percent of self-identified participants in the physical restraint theme<sup>9</sup> reported making effective care changes influenced by the QIO, and 66 percent reported measureable improvements in physical restraint use. In line with the survey findings, several providers we visited reported making specific changes to care as a result of working with the QIO. For example, one facility reported that while working with the QIO, they eliminated both vest restraints and bed rails, replacing them with alternatives such as low beds and floor mats.

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<sup>9</sup> As in the hospital survey (see Chapter V, Section A above), we relied on nursing homes' own reports of whether or not they had participated with the QIO on a particular theme to categorize facilities as PPs or NPs.

Most notably, the director of nursing (DON) at this facility cited a change in process for how the nursing staff dealt with restraints (see quotation).

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*“Now the staff know that they do not restrain anyone until they talk to me. The nurses’ first thought is to not let anyone get hurt, but now they have been educated on how the restraint can make the resident more agitated and therefore worse off if they [the resident] try to remove it.”*

*–Nursing home DON.*

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Another nursing home gave credit to the QIO for the facility’s attention and focus on reducing restraints, resulting in their being restraint-free for the past year. One facility made use of a standardized tool provided by the QIO to evaluate restraints; they had improved the monitoring during busy times of residents who have had restraints removed by increasing residents’ participation in recreational activities. Other facilities reported that QIOs had helped them to improve the accuracy of their coding of restraints within the Minimum Data Set (MDS), which also contributed to a reduction in their rates.

However, not all nursing homes reported an impact under this theme. A few we interviewed did make changes to reduce the use of restraints, but not because of the QIO. Instead, the QIO mainly validated what they were already doing. As we heard from a couple of facilities during site visits, the QIO’s ability to further reduce restraint rates may have been limited in states that were already “low restraint” states. Nursing homes in these states already had very low use of restraints and reported making no changes as a result of working with the QIO. That facilities are working toward reducing restraint rates by themselves, or with outside help, is consistent with our survey data in which 68 percent of nursing homes who did not participate with the QIO on the physical restraint theme reported having internal efforts that led to reductions in physical restraint use. However, a much larger proportion of nursing homes who did participate in the physical restraint theme, compared to those who did not (91 percent versus 68 percent), reported having effective internal efforts to reduce physical restraint use. This is consistent with our expectation that participation with the QIO would stimulate more and more effective internal nursing home efforts focused on the target measures.

**Pressure Ulcers.** All the QIOs we visited felt they had an impact on the rate of pressure ulcers among participating providers. This assertion was corroborated by several nursing homes we spoke with who described making specific and meaningful changes to pressure ulcer care due to working with the QIO. These changes included shifting the focus of nursing home staff away from the treatment of pressure ulcers and toward the prevention of pressure ulcers, the completion of daily or weekly skin assessments, improved pain reporting and accountability among facilities that reported pressure ulcer data to the QIO, completion of risk assessments and risk-based care plans, and the use of root-cause analysis to implement appropriate care changes. One facility cited the QIO’s education of staff on the importance of performing weekly Braden scales and daily skin assessments (see quotation). Others attributed their reduction in pressure ulcer rates to the structure and focus that the QIO offered in the form of standardized procedures and frequent reminders to nursing home staff to complete weekly skin assessments.

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*Our pressure ulcer rates decreased dramatically. Prior to working with the QIO, we stopped our intervention once the pressure ulcer healed. But the QIO helped us to continue those interventions even after they were healed. So for a long time, we went without any pressure ulcers after we made those changes.”*

*–Nursing home staff member*

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The three facilities whose staff felt that the QIO had no impacts on their pressure ulcer activities noted that they already had existing processes and tools in place. Two of these facilities were connected to a larger corporation or health care system and felt that they had all the needed QI support, while the DON at another facility was comfortable drawing from existing online resources and best practices on her own.

Finally, the survey data confirmed that efforts to reduce pressure ulcer rates in nursing homes are widespread among both participating and nonparticipating facilities. Ninety-nine percent of pressure ulcer theme participants and 82 percent of nursing homes who did not participate in the pressure ulcer theme reported internal quality improvement efforts that led to improvements in pressure ulcer rates.

## 2. Impact Analyses

Like the hospital SCIP/HF impact analyses, the nursing physical restraint and pressure ulcer impact analyses also relied on a regression discontinuity approach (Table V.1), and so we first conducted descriptive analyses of trends in the study outcomes, followed by visual analyses of the study outcomes plotted against the forcing variables, followed by the formal impact analyses.

### Trends in Quality Measures.

On average, use of physical restraints at baseline<sup>10</sup> was substantially higher among PPs than NPs. This is to be expected because the J-17 physical restraint recruitment list consisted of providers with higher physical restraint rates and PPs were disproportionately drawn from that target list. Those rates declined among both physical restraint PPs and NPs between the baseline four quarters before the 9th SOW (the period July 2007 through June 2008) and the last four quarters of available data (July 2009 through June 2010). As shown in Table V.5, rates among PPs declined from 9.6 to 3.4 percent, roughly two-thirds the starting rate. This compares with a decrease of 1.2 percentage points for NPs from a baseline rate of 3.8 percent. PPs had a larger potential for improvement because they started from a higher baseline rate. This was expected given that most PPs were picked from the J-17 pool of providers that had higher rates by definition. Among the subset of NPs on the J-17 list, the average change in rates of physical restraint use was -5.1 percentage points—slightly less than that of PPs. The baseline rate of physical restraint use for NPs on the J-17 list is higher than for PPs because some PP nursing homes were not on the J-17 list and because, among providers on the J-17 list, those with

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<sup>10</sup> As described in Volume II, Chapter II, Section A, the baseline period is the four quarters before the start of the 9th SOW (the period July 2007 through June 2008).

**Table V.5. Nursing Home Physical Restraints Theme: Change in Physical Restraint Use Between Baseline and Followup**

Quality Improvement Activity Outcome Measure	PP <sup>a</sup>	NP, <sup>a</sup> All	NP, Target List <sup>b</sup>
Physical Restraints			
Baseline (%)	9.6	3.8***	12.0***
(SD)	(6.7)	(5.6)	(10.2)
Followup (%)	3.4	2.6***	6.9***
(SD)	(4.2)	(4.5)	(8.6)
Change	-6.2	-1.2***	-5.1***
(SD)	(6.6)	(4.8)	(9.0)
N <sup>c</sup>	1,056	13,119	1,355

Source: Target list status is taken from a data file provided by the Colorado Foundation for Medical Care. Rates of physical restraint use are calculated from MDS data (Baseline: July 2007–June 2008; followup: July 2009–June 2010).

<sup>a</sup>PPs are those nursing homes recruited by QIOs to work on reducing the particular outcome in question. The set of physical restraint PPs and pressure ulcer PPs overlap, but are not identical (150 nursing homes participated in both themes).

<sup>b</sup>Providers on the J-17 target list are those with low performance on a given measure in the three quarters between Q4 2006 and Q2 2007. For the physical restraint theme they are nursing homes with at least two of the most recent three quarters of data showing results of 8 or more percentage points away from the goal of 3 percent.

<sup>c</sup>The sample of nursing homes used at baseline and followup for the given measure and sample is identical.

\* Significantly different from zero at the .10 level, two-tailed test

\*\* Significantly different from zero at the .05 level, two-tailed test

\*\*\* Significantly different from zero at the .01 level, two-tailed test

baseline rates nearer to the selection threshold were somewhat more likely to participate than were those with the highest rates.<sup>11</sup>

The patterns for PPs and NPs in the pressure ulcers theme (Table V.6) are qualitatively similar to those in the physical restraint theme. Rates of pressure ulcer prevalence—the focus measure for this theme—started higher and declined more among PPs than NPs (4.3 versus 1.5 percentage points, respectively). However, NPs on the J-17 list—a subset of NPs with average baseline rates more similar to PPs—experienced declines in pressure ulcer rates that were closer to those of PPs (4.1 percentage points).

<sup>11</sup> It is not possible to tell from the data whether it was QIOs' recruitment decisions or providers' willingness to participate that led PPs to be drawn somewhat more from J-17 providers with rates nearer the selection threshold than from those with rates further from the threshold.

**Table V.6 Nursing Home Pressure Ulcer Theme: Change in Pressure Ulcer Prevalence Between Baseline and Followup**

Quality Improvement Activity Outcome Measure	PP <sup>a</sup>	NP, <sup>a</sup> All	NP, Target List <sup>b</sup>
Pressure Ulcers in Long-Term Care Residents			
Baseline (%)	17.1	11.4***	18.8***
(SD)	(9.0)	(7.4)	(10.1)
Followup (%)	12.8	9.9***	14.8***
(SD)	(7.7)	(6.8)	(9.1)
Change	-4.3	-1.5***	-4.1
(SD)	(9.8)	(8.2)	(11.1)
N <sup>c</sup>	961	13,211	965

Source: Target list status is taken from a data file provided by the Colorado Foundation for Medical Care. Rates of pressure ulcers among high-risk patients are calculated from MDS data (baseline: July 2007–June 2008; followup: July 2009–June 2010).

<sup>a</sup>PPs are those nursing homes recruited by QIOs to work on reducing the particular outcome in question. The set of physical restraint PPs and pressure ulcer PPs may overlap, but are not identical (150 nursing homes participated in both themes).

<sup>b</sup>Providers on the J-17 target list are those with low performance on the given measure in the three quarters between 2006 Q4 and 2007 Q2. For the pressure ulcer theme they are providers with at least two of the most recent three quarters of data showing results of 14 or more percentage points away from the goal of 6 percent.

<sup>c</sup>The sample of nursing homes used at baseline and followup for the given measure and sample is identical.

\*Significantly different from zero at the .10 level, two-tailed test

\*\*Significantly different from zero at the .05 level, two-tailed test

\*\*\*Significantly different from zero at the .01 level, two-tailed test

**Visual Analysis.** The plot for the physical restraints measure (see Appendix Figure C.6) suggests a favorable impact of the QIO program. However, the plot for the pressure ulcers measure does not show clear evidence of program impact (see Appendix Figure C.8).

**Statistical Analysis.** Results of statistical estimates of the size and statistical significance of the impact of QIOs' work in the physical restraint theme are provided in the top panel of Table V.7, which presents results based on our primary bandwidth ( $\pm 5$  percentage points). All of the presented results are from linear models.

There is strong evidence that QIOs reduced restraint rates by an average of 2.39 percentage points ( $p \leq .01$ ). This equates to a more than 50 percent reduction in physical restraint use from the 4.7 percent rate expected by threshold providers to have in the absence of the intervention. This estimate is consistent with the visual inspection of the plot in Appendix Figure C.6 and is robust to sensitivity tests using alternative bandwidths (see Volume II, Chapter II, Section A). We also conducted two supplemental analyses of the impacts of participating nursing homes in the physical restraint theme on two outcomes not targeted by the theme: (1) pressure ulcer rates (shown in Table V.7), and (2) overall state survey deficiencies score (not shown). No



**Table V.7. Nursing Home Physical Restraints and Pressure Ulcer Components: Estimated Impacts of QIOs' Work with PPs on Physical Restraint and Pressure Ulcer Prevalence**

	Estimated Average Rate Without Intervention <sup>a</sup>	Estimated Impact of Intervention	Number of Nursing Homes
<b>Physical Restraint Theme</b>			
Physical Restraints (target outcome for this theme)	4.7	-2.39*** (0.66)	3,769
Pressure Ulcers (not a target outcome for this theme)	10.4	0.67 (0.97)	3,769
<b>Pressure Ulcer Theme</b>			
Pressure Ulcers (target outcome for this theme)	2.5	-0.24 (0.91)	4,380
Physical Restraints (not a target outcome for this theme)	13.0	0.56 (0.48)	4,380

Sources: Target list status is taken from a data file provided by the Colorado Foundation for Medical Care. Rates of physical restraint use and pressure ulcers among high-risk patients are calculated from MDS data (baseline: July 2007–June 2008; followup: July 2009–June 2010). Deficiencies scores are calculated from state inspection data and are top-coded at 250. Provider-level covariates are derived from Nursing Home Compare (March 2009 archive). County-level covariates are from the 2008 Area Resource File.

Note: Results are produced using a two-stage least squares local linear or polynomial specification and reflect the estimated difference in the outcome for providers just above and just below the J-17 selection threshold. The models use a linear specification to capture the relationship between the forcing variable and the outcome. Tests using quadratic specifications found no statistically significant nonlinearities in that relationship. Being on the J-17 list is used as an instrument for PP status. Specifications include all measures from Tables II.5 and II.6 in Volume II, as well as the baseline (2007 Q3-2008 Q2 average) of the particular measure, as covariates. The sample for the primary bandwidth analyses includes all nursing homes with forcing variable scores within  $\pm 5$  percentage points for the impact analyses of the PR component and  $\pm 6$  percentage points for the pressure ulcer component.

<sup>a</sup>Regression-based estimate of what the average rate of the outcome would have been among providers at the selection threshold had the intervention not occurred

\*Significantly different from zero at the .10 level, two-tailed test.

\*\*Significantly different from zero at the .05 level, two-tailed test.

\*\*\*Significantly different from zero at the .01 level, two-tailed test.

significant impacts were found, suggesting that the favorable impact on physical restraints of the theme was, in fact, a specific effect, with no “spillover” effects.<sup>12</sup>

The bottom panel of Table V.7 also shows impact estimates for the pressure ulcers theme. The analyses did not detect an impact of the pressure ulcer theme on the primary target measure of pressure ulcers among high risk long-stay patients. We also did find no spillover impacts of the pressure ulcers theme on either the nontargeted outcomes of physical restraints (shown in Table V.7) or the overall state survey deficiencies score (not shown).

One key difference between physical restraints and pressure ulcers that may explain why QIOs achieved favorable impacts in the first and failed to do so in the second, is that the rate of physical restraints is essentially a measure of process, whereas the rate of pressure ulcers is actually a measure of a clinical outcome that has multifactorial causes. Healing pressure ulcers

<sup>12</sup> As a broader test of spillover effects, we also examined impacts of both nursing home themes on deficiencies identified through state inspections. We also found no impacts on the deficiencies score.

and preventing their occurrence in the first place requires intensive staff education and training to establish durable changes in staff behavior whose effects may not be apparent for a longer period of time. One QIO pressure ulcer theme leader expressed the contrast between the two measures (see quotation).

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*“Pressure ulcer care is a 24/7 and 365-day-a-year job. If you slip up, pressure ulcers will return. Unlike pressure ulcers, once you’ve made the commitment to reduce physical restraints, they go down and then away and even if you take your eye off the ball, it doesn’t come back.”*

*-QIO pressure ulcer theme leader*

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QIOs and providers stressed both the need for and the challenges of ongoing staff training in the care of pressure ulcers, especially because of high staff turnover and, in many cases, unstable leadership. One QIO theme leader commented that these challenges made the time period for the pressure ulcers theme too short: “It takes 12 months just to educate everyone.” Another QIO theme leader pointed out the attitudinal barriers to reducing pressure ulcer rates (see quotation). This theme leader went on to say, “Previously, the nursing homes had believed that all ulcers were coming from the hospitals and that they just happened. We really had to facilitate a culture change and alter their mind set.” As previously noted, a high proportion of nursing homes reported making meaningful improvements in pressure ulcer care due to the QIO but the changes may not have been enough to result in detectable impacts, given the difficulty in affecting this outcome.

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*“This theme [pressure ulcers] was slow to get started. First, the problem needed to be defined. Many facilities were holding the belief that they were not able to control whether or not a resident got a pressure ulcer...”*

*-QIO pressure ulcer theme leader*

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Three other possible explanations for the lack of impacts on pressure ulcers are (1) a too short followup period, (2) a “bottoming out of the measure” (that is, that there may be a certain proportion of pressure ulcers that are unavoidable, and that no further reductions were possible), and (3) the widespread efforts to lower pressure ulcers among nursing homes not working with a QIO. First, the data for this analysis only extended through the 23rd month of the 9th SOW, and it is possible that impacts may emerge after this period. However, a comparison of our present results with interim analyses we conducted using data through the 20th month do not show evidence of emerging impacts. Second, although it is true that some fraction of pressure ulcers may not be preventable (and a zero rate thus unattainable), the simple pre- and post- trends in Table V.6 do show that additional reductions from baseline were achieved by both PPs and NPs, even if there were no detectable impacts of QIOs’ work on PPs versus NPs. At least some nursing homes have access to other QI resources besides their QIOs. As shown earlier in Table V.6, nursing homes that had high rates of pressure ulcers at baseline, but did not work with QIOs in the pressure ulcer theme, also made substantial improvements in pressure ulcer prevalence. Thus, even if QIOs help to decrease pressure ulcer rates among participating facilities,

concurrent declines in pressure ulcer rates (for other reasons besides the QIO) among nonparticipating facilities might make QIO impacts difficult to detect.

**Are Certain QIO Approaches for Physical Restraints and Pressure Ulcers More Effective Than Others?** Although the two cluster analysis subgroups for the physical restraints theme, High C–High I–High G and Low C–High I–Medium G, both achieved significant favorable impacts, the two estimates were not significantly different. In other words, both bundles of approaches were effective and we cannot say which one was more effective.

Impacts on pressure ulcers were not significantly different for the three cluster analysis subgroups. They also did not differ for the two pairs of application of field knowledge subgroups. That is, impacts were no different for QIOs that discussed providers' performance with them, trained their staff, and routinely provided feedback data and benchmarks versus impacts for QIOs that did not perform these three activities. Similarly, there were no significantly different impacts on pressure ulcers between QIOs that worked primarily with providers they had previously worked with versus those that did not work with such providers.

**Does the Overall QI Environment Affect QIOs' Effectiveness in the Physical Restraints and Pressure Ulcers Themes?** There was some evidence that QIOs operating in a supportive environment achieved larger impacts in the physical restraint theme (a 1.9 percentage point reduction) than did QIOs in non-supportive environments (an increase of 1.5 percentage points)( $p < 0.05$  for the difference in impacts); there was no difference for supportive environment for pressure ulcers, however.

**Are the QIO Interventions More or Less Effective for Certain Types of Providers?** QIOs were equally effective for all types of nursing homes in the physical restraint theme, with significant, favorable impacts on small versus large, rural versus urban, and independent versus chain nursing homes. On the other hand, in the pressure ulcer theme, QIOs were equally ineffective across the same array of nursing home characteristics.

## **D. Nursing Homes in Need (NHIN)**

In the NHIN theme, QIOs worked with a very small number of nursing homes that had serious quality problems. These homes generally had multiple state survey deficiencies that led to their being placed on the CMS' Special Focus Facility list of nursing homes in particular need of remediation and monitoring (CMS 2011). The QIOs' contract performance in this theme was based on improvement in two specific measures—physical restraints and pressure ulcers—even though NHINs' deficiencies and quality problems may not have been in these two measures. Our site visits and surveys of QIO directors and theme leaders suggested that QIOs had not only helped the nursing homes with physical restraints and pressure ulcers, but also with making broader changes that improved overall quality of care.

### **1. Survey and Site Visit Results**

All but one of the eight QIOs that we visited felt they had improved the quality of care at participating nursing homes. The one exception was a QIO whose year one and two NHINs withdrew from the program. The remaining QIOs all noted that while they had helped their NHINs make significant improvements in the targeted clinical measures (pressure ulcers and

physical restraints), they felt that they had made deeper and more lasting contributions to these NHINs. For example, some QIOs had:

- Taught the facilities how to use several general QI techniques, such as data driven QI and the implementation of standardized processes of care
- Facilitated development of the nursing home’s leadership
- Helped facilities establish QI teams for the first time

One QIO found that the NHINs it had worked with needed little help with restraint and pressure ulcer measures, but gained knowledge from the QIO’s helping them with survey deficiencies that had placed them on the list in the first place.

One QIO director commented on their overall experience of this theme. “We found out early that just focusing on the clinical measures was not the path to success. There were reasons within the facilities as to why their performance had deficits. It came down to management and systems and the ability to use data (see quotation). This perceived misalignment between the QIOs’ 9th SOW and CMS’ evaluation metrics for the QIOs was also reflected in our surveys of QIO directors and theme leaders. Sixty percent of NHIN theme leaders suggested that CMS change the focus of the NHIN theme and 45 percent suggested that the evaluation metrics for the theme be changed and more accurately reflect QIO’s work at the NHIN facilities.

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*“We had nursing homes who didn’t know how to monitor improvement ... and so we really didn’t focus on the clinical measures so much as opposed to building the capacity to improve.”*

*-QIO director*

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Several of the five NHIN facilities we visited reported making meaningful changes that improved care. One facility said they had reduced their pressure ulcer rate as a result of preventive measures and identification and treatment steps their QIO had encouraged them to implement. The facility had decreased its monthly rate of acquired pressure ulcers of three to four before working with the QIO to one per month. Noting the benefits of the QIO’s fresh perspective (see quotation), the DON of this facility went on to say, “Even though we’re a big corporation, we’re almost too big—it can be hard to network within the company. They [the QIO] brought new ideas to us, and it was helpful to have outside people bring in the education. The staff was more receptive [to the QIO] than they would’ve been to me, the DON.”

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*“Having someone come in from ‘the outside’ makes a big difference because we see the same things every day. They pick up on things that we’re missing ...”*

*-Nursing home DON*

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For a small, independent facility that lacked internal support for QI, the QIO was instrumental in providing a structured management process for its new skin program. In addition, the QIO provided valuable tools such as a weekly wound record and the perspective of

an outsider. For both the large and small facilities, the QIO provided general QI guidance and expertise, and played a troubleshooting role when they experienced challenges. For example, the larger nursing home above reported also receiving QIO assistance with whatever help they had needed, including help on pain, falls, and the proper coding of restraints.

The QIO helped a third facility to become restraint-free by facilitating a committee of nursing home staff responsible for this goal and by providing on-site training on the use of restraint alternatives. The QIO maintained a close working relationship with the facility through weekly calls and monthly in-person visits and was about to start work on wound care at the time of our visit. The nursing home administrator thought the QIO provided extra motivation for the staff to make improvements and wished the QIO could provide even more on-site staff education. “It would be helpful to have someone [from the QIO] to stay for 30 days to work intensively with staff, on site.”

The DON of one of the other two NHIN facilities we visited felt that while the QIO’s assistance had given her a needed “kickstart”, the ultimate impact on the facility was limited because the QIO had to stop working with the facility following its receipt of an immediate jeopardy (IJ) tag from the state.<sup>13</sup> The other facility did not feel that the QIO made any impact on their quality of care. The QIO representative reportedly told the nursing home staff that they “had everything they needed [for QI] already set up.”

The QIOs we spoke to explained that NHIN facilities are placed on the Special Focus Facilities list for a variety of reasons, often suffering from underlying structural issues such as constant turnover in leadership, changes in management, or large facility renovations. In these instances, QIOs often worked with nursing home leadership to catalyze the staff in their ultimate identification of the root causes of poor performance and development of an improvement plan. Facilities often had to tackle these larger issues before moving on to more clinical quality improvement work regarding issues like pressure ulcers and physical restraints. In site visits and the survey, QIOs pointed out that solving these larger structural issues takes time. One QIO theme leader characterized the NHIN work as “expensive,” requiring “very intensive effort and a high number of hours.” Similarly, 45 percent of NHIN theme leaders in our survey suggested that there be more time for QIOs to work with the selected nursing homes; ample time is needed for QIOs to gain providers’ trust and to apply the persistent and consistent efforts to help facilities improve care.

## 2. Descriptive Trend Analysis

Because of small sample sizes and the fact that Special Focus Facilities could refuse to participate when approached by QIOs, the NHIN theme did not permit the creation of a statistically equivalent comparison group and thus the performance of an impact analysis. We therefore performed a trend analysis. However, this analysis does suggest a favorable program effect. Each QIO was originally to recruit one NHIN each year and work with that NHIN for

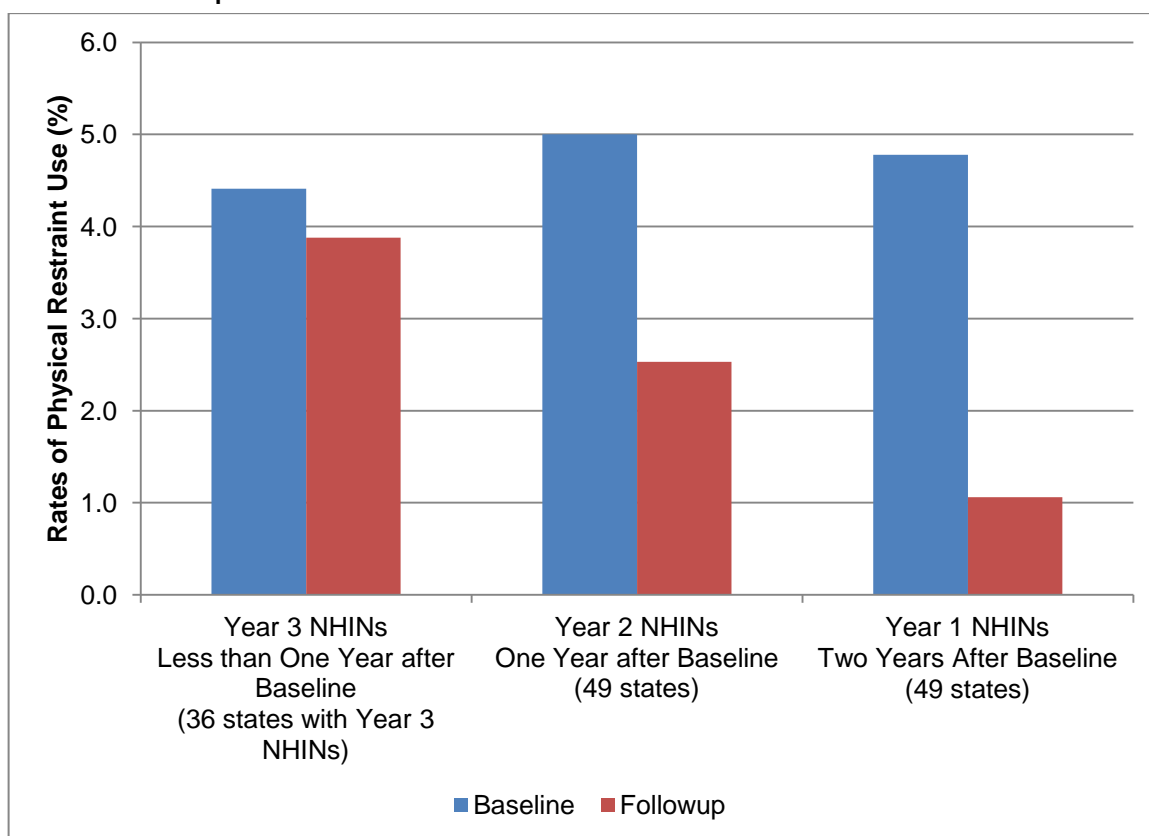
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<sup>13</sup> IJ is defined as “a situation in which the provider’s noncompliance with one or more requirements of participation has caused, or is likely to cause, serious injury, harm, impairment, or death to a resident” ([http://www.cms.gov/manuals/Downloads/som107ap\\_q\\_immedjeopardy.pdf](http://www.cms.gov/manuals/Downloads/som107ap_q_immedjeopardy.pdf)). A facility with an IJ tag is considered no longer in compliance with Medicare’s participation requirements and therefore ineligible for Medicare payments; CMS determined that QIOs should not work with providers that do not meet conditions for participation in the Medicare program.

one year. By the end of the three-year SOW, each QIO would thus have worked with a total of three NHINs for one year each. There are data on 49 QIOs for the first and second years of the NHIN theme. However, during the second year of the 9th SOW, CMS cancelled the third year of NHIN work for several QIOs, so there are fewer QIOs with a third year of data. We conducted a descriptive analysis of time trends in baseline and followup values for three quality measures—physical restraints, pressure ulcers, and a composite score of survey deficiencies—for the three cohorts of nursing homes targeted under the theme. As described in Section C.1 of Chapter II of Volume II, the followup data for both the physical restraints and pressure ulcers measures and for the composite deficiency score only extend until the spring of 2010, by which time only the year 1 cohort of nursing homes would have had any meaningful exposure to the QIO Program, as the 9th SOW only started in August 2008. Year 2 cohort would have had a few months of exposure, and year 3 cohort no exposure at all.

Figure V.2 shows the trends for the physical restraint measure, which are the most illustrative of the patterns of change, although we found similar results for pressure ulcers and the composite survey deficiencies score (see Figures C.10 and C.11 in the Volume II Appendix).

**Figure V.2. Baseline and Followup Rates of Physical Restraints for NHINs with Zero, One, and Two, Years of Followup**



Source: MDS data (Baseline: July 2007-June 2008; Followup: April 2009-March 2010). The sample of nursing homes used for the baseline and Year 2 cohorts differs from that of the Year 3 cohorts because CMS cancelled the Year 3 NHIN task for several states. Also, although Texas had two NHINs in its Year 2 cohort, we retained for analysis only the nursing home with the baseline deficiency score nearest that of its Year 1 counterpart. There is thus only one nursing home from any state in a given cohort. Results are similar if the Year 1 and Year 2 samples are restricted to the same 36 states that have Year 3 data.

Year 1 nursing homes improved notably. Since higher levels represent lower quality, reductions between baseline and follow-up represent improvement. The Year 2 cohort also improved, though somewhat less than the Year 1 cohort. In contrast to the results for the Year 1 and 2 facilities, the Year 3 cohort of NHINs showed only slight improvement. The Year 3 facilities again started at somewhat better baseline levels than did the Year 1 cohort, but the improvements of the Year 1 cohort are substantially larger than those of the Year 3 cohort. Since the Year 1 cohort is the only cohort with any meaningful exposure to the QIO Program, the pattern of observed changes is consistent with favorable impacts from the QIO Program, although again, these descriptive analyses do not enable us to make that attribution.

## **E. Drug Safety**

### **1. Survey and Site Visit Results**

The drug safety theme afforded QIOs greater flexibility to design their own interventions than did the other themes. The nature of the interventions, specific problems to be addressed and measures to be used, and the organizations targeted or partnered with thus varied widely across states. The drug safety theme is another theme like MRSA for which no impact analysis was possible because of the lack of an identifiable intervention group or a statistically equivalent comparison group. During our site visits, in addition to interviewing QIO staff, we also spoke to one hospital's drug department, two physician practices, two health insurance plans, a pharmacist professional association, and a pharmaceutical provider for nursing home and assisted living facilities.

Multiple respondents expressed appreciation for the theme's flexibility. One QIO noted that it was easier to argue a convincing business case when the drug safety problems to be addressed were directly relevant to providers and patients in the state. Another commented that, "All the topics the QIO focused on [in this theme] were all very appropriate and high-impact issues."

Seven of the eight states we visited reported that their interventions had an impact on drug safety, as measured by rates of drug-drug interactions and potentially inappropriate medications. The QIOs pursued various statewide strategies to foster more frequent conversations between patients, physicians, and pharmacists about prescribed drugs, and developed and distributed wallet cards for patients to document medications. Respondents felt these strategies were successful. In four states this approach was combined with efforts to change physicians' prescribing practices. Interestingly, the eighth state did not implement a drug safety intervention, yet still noted improvements on its drug safety measures.<sup>14</sup>

While all seven QIOs and several of their partner organizations believed there had been improvement in drug safety, some partner organizations hesitated to attribute all success to the QIO. One partner organization conceded that its QIO had "made the process a little bit easier," but played a relatively small role in an intervention that was driven primarily by the partner organization itself. In two states, partner organizations noted the absence of hard data to prove the QIOs' role in observed improvements, in light of other efforts underway. A partner in a third

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<sup>14</sup> Each QIO developed its own drug safety measures based on Medicare Part D prescription claims data appropriate for selected target outcomes and the interventions they had designed. We did not have access to these measures or data.

state noted that their interaction with the QIO was limited to receiving medication trifold wallet cards for patients to record their medications. Nevertheless, many partners credited the QIOs with the important contributions of raising awareness about drug safety and convening important stakeholders who would otherwise have not worked together.

## F. Prevention Disparities Theme

Unlike the other themes, the six QIOs participating in the prevention disparities theme worked directly with beneficiaries, offering a training program on diabetes self-management. Apart from their beneficiary protection function, QIOs had never worked directly with beneficiaries in previous SOWs. A quantitative impact analysis of the beneficiary diabetes self-management training was not possible as there was no available means of identifying participating beneficiaries. The theme also involved QIOs working with providers that served large proportions of underserved beneficiaries with diabetes, but a quantitative comparison group analysis of these activities was also not possible because it was not feasible to identify participating providers in Medicare claims data through QIO records. We conducted site visits to two states participating in this theme.

We visited three physician practices involved in the theme, all of whom served large minority populations and many patients with diabetes. One staff member we spoke with had observed the QIO-sponsored training and felt it to be an effective patient educational program. For example, the program used powerful “visuals” to convey the amounts of sugar in different types of food. Thirty to 40 patients from her practice had enrolled in the program, and she believed that it helped many of them make dietary changes, resulting in improved HbA1c levels. According to her, one physician in the practice had strongly endorsed the training (see quotation). The second clinic we visited had a negative view of the training, however. Only seven or eight of their patients had attended the first training session, and no one returned for the second. This interviewee noted that “much of the literature that [the QIO] provided to these people has been wasteful, people leave them around as trash.”

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*“The physician has said he wants all his patients with diabetes to take this [QIO-sponsored diabetes] training every two years.”*

*-Staff member, physician practice participating in prevention disparities theme*

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Two of the three practices also reported that the QIO had helped them make changes in process or “focus.” The third practice, a larger clinic, did not need help, but did comment that small “mom and pop” offices with less knowledge of QI could benefit from QIOs’ services.

## G. CKD Theme

The QIO CKD activities focused on improving microalbuminuria screening; appropriate use of angiotensin converting enzyme and angiotensin receptor blocker drugs (ACE and ARB drugs) by patients with CKD, hypertension, and diabetes; and early arteriovenous fistula (AV fistula) placement for patients nearing hemodialysis. Achieving the first two goals involves primary care practices and the latter adds nephrologists or vascular surgeons.



## 1. QIO Partner Discussion and Site Visit Results

CKD partners listed by the QIOs were first screened through a short survey to determine level of involvement. Most of those we were able to reach within the allotted timeframe self-reported that they were either “very involved” (44 percent) or “somewhat involved” (43 percent) in the theme’s activities with the QIO. From this group, we focused our telephone discussions most heavily on the “very involved” group (38 of 53 interviews) to learn what types of changes to care they may have made as a result of their QIO contacts.

We found many examples of positive change. Of the 17 interviewed primary care physicians who did not previously have systematic processes in place for adhering to CKD guidelines, all but two instituted them within their offices after working with the QIO. The practices undertook a variety of system changes, with most practices implementing at least one. These processes included: giving patients at risk for CKD regular followup appointments to enhance monitoring, making annual urine microalbumin and serum creatinine testing part of routine order sets, and having medical assistants and nursing staff collect urine samples for testing when patients arrived in the exam room rather than waiting for an order. Practices with EMRs either implemented alerts notifying providers at the point of care that testing was needed, or the medical staff ran reports to identify patients at risk for CKD and due for urine microalbumin testing. One practice developed a CKD registry while another assigned CKD patients to a mid-level practitioner for protocol-driven, followup care.

Early referral to a nephrologist or vascular surgeon (essential for timely fistula placement) requires primary care providers to monitor patients’ renal function and promptly refer them once that has declined to a critical level. The recommended measure of renal function is the estimated glomerular filtration rate (eGFR). Unfortunately this value is not routinely reported by all medical laboratories and must be separately calculated. One of the CKD collaboratives worked with hospital and independent medical laboratories to routinely estimate and print the eGFR whenever serum creatinine is measured so that providers did not have to do it themselves. In addition, physicians and nephrologists also enhanced the amount of beneficiary education they were providing to motivate patients to improve their disease self-management activities. Nephrologists and dialysis centers credited the QIOs with helping them make changes to increase the number of early fistula placements, such as increasing the use of vein mapping, providing “save-the-vein” bracelets,<sup>15</sup> and earlier referrals to vascular surgeons.

Although primary care physicians and renal specialists felt that the QIOs had helped them to implement processes to improve performance in two of the theme measures (urine microalbumin screening and early referrals for fistula placement), they did not feel that the QIO had made any difference in the third measure, increasing the prescription of ACE inhibitors and ARB agents for at-risk patients. Although primary care providers said QIOs had increased their awareness of the problem, they reported no operational changes to increase adherence to the measure.

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<sup>15</sup> Save-the-vein bracelets are used to both remind the patient to keep their diabetes and hypertension under control and to inform patients and health care professionals to avoid using their bracelet arm for blood pressure tests, IV lines, blood testing, or any other type of activity that could compromise the vein’s functioning.

**Table V.8. Estimated Impacts of QIO Efforts on CKD Quality of Care Scores: Regression-Adjusted Predicted Means at Followup (October 2009–September 2010) (Percentages)**

	Intervention Counties with CKD Intervention	Intervention Counties Without CKD Intervention (Counterfactual)	Difference	p-value
<b>CKD1 Measure</b>				
Received microalbuminuria test (CKD1a)	44.4	43.8	0.6	0.001***
Number of all beneficiaries with diabetes <sup>a</sup>	1,051,798	657,514		
<b>CKD3 Measures</b>				
Received AV fistula (CKD3a)	20.9	20.6	0.3	0.770
Received maturing AV fistula (CKD3b)	21.6	19.6	2.0	0.122
Received either CKD3a or CKD3b indicator (CKD3c)	42.5	40.4	2.3	0.148
Number of beneficiaries with CKD initiating dialysis <sup>b</sup>	5,730	4,020		

Sources: Medicare claims and enrollment data as processed for CKD quarterly analytic files, Area Resource File (2008), CHSI (2008) data.

Notes: For each measure, predicted means are based on a multivariate logistic regression that controls for person-level characteristics and a few county-level characteristics that differed between intervention and comparison counties. The person-level control variables include age, gender, and race. See Table II.22 in Section B of Chapter II of Volume II for the full list of control variables for both CKD1 and CKD3 estimated models. The estimated means account for the weighting used in other analyses that addresses matching with replacement.

Section B, in Chapter II of Volume II provides a more detailed explanation of the computation and interpretation of the estimated intervention and counterfactual means.

<sup>a</sup>As determined by an algorithm that identified all Medicare beneficiaries with claims for specific types of health care encounters in a baseline period with diagnostic codes for diabetes.

<sup>b</sup>As determined by CMS Form 2728, which is required to be submitted by providers for all newly diagnosed end-stage renal disease patients, regardless of their Medicare status or treatment modality.

\*Significantly different from zero at the .10 level, two-tailed test.

\*\*Significantly different from zero at the .05 level, two-tailed test.

\*\*\*Significantly different from zero at the .01 level, two-tailed test.

## 2. Impact Estimates

We found a statistically significant, favorable effect of the QIO program on the rate of testing for microalbuminuria, although the magnitude of this effect is small: the rate of testing is 0.6 percentage points (or 1.4 percent) higher in intervention areas. We found no statistically significant effect on the early placement of an AV fistula (Table V.8).<sup>16</sup> To obtain impact estimates, we first used propensity score matching to find a comparison group for the 859 intervention counties in the 10 CKD states,<sup>17</sup> separately matching counties for urinary

<sup>16</sup> Impact analyses for the third CKD theme measure, prescription of ACE/ARB drugs, were not feasible because of the lack of an accurate measurement of the number of ARB and ACE prescriptions filled. Many of these drugs are offered at a low cost by large chain pharmacies such as Wal-Mart or Walgreen's, and many beneficiaries find it less expensive for them to purchase the prescriptions directly than to acquire them through their Part D plans. Thus, Part D claims data capture only a fraction of the total number of prescriptions filled.

<sup>17</sup> QIO activities in the prevention CKD theme are designed to affect provision of health care at the state level.

microalbumin testing and AV fistula outcomes. We then performed a difference-in-difference impact analysis with a logistic specification. A patient-level model was estimated for all patients residing in the 859 intervention and 537 selected comparison counties for the urinary microalbumin testing rate, and 586 intervention and the selected 561 comparison counties for the AV fistula placement outcome. Because there are few beneficiaries who suffer from kidney failure who are also eligible for AV fistula placement, there were eligible beneficiaries in 586 of the 859 intervention counties at baseline.

In contrast to the small, favorable impact on microalbuminuria testing found in the current analysis, we detected no such impacts in our previous interim report (Zurovac et al. 2011). The lack of impacts in the earlier analysis may have been due to an insufficient period of followup after the actual start of QIOs' CKD activities.<sup>18</sup> However, the data available for this report covers more time after the initiation of CKD activities. In our qualitative data, both QIOs and providers said the QIOs had convinced providers to implement operational changes to increase screening and monitoring of patients for microalbuminuria, especially those at highest risk for CKD. It is possible, however, that few providers actually implemented changes.

Although intervention areas have much larger rates of placement of a maturing AV fistula (10 percent higher), the lack of statistically significant impacts on the AV fistula measure could be due to the smaller sample sizes for this analysis. In addition, other nationwide quality improvement initiatives, such as Fistula First, might have affected the rates of placement in both intervention and comparison areas ([www.fistulafirst.org](http://www.fistulafirst.org)). Although several interviewees in our partner discussion noted that nephrology practices and dialysis centers had made QIO-instigated systematic changes in processes of care to improve early fistula placement, we purposely chose to speak to highly motivated practices rather than a representative sample of practices, since our goal was to understand how providers could benefit through an active QIO relationship<sup>19</sup>.

In general, there are many regional and national non-QIO QI initiatives for diabetes and CKD care whose objectives overlap with those of the CKD theme. They affect both comparison and intervention areas, increasing the difficulty of detecting impacts for the QIO programs. We found in the quantitative analyses that the unadjusted (raw) rates of urinary microalbumin testing increased from baseline to followup in both intervention and comparison areas, with a greater increase in intervention areas; this positive finding was confirmed (and found significant) in the impact analysis. The unadjusted rates of AV fistula placement generally decreased (an undesirable change) in both intervention and comparison areas (with a not statistically significantly smaller decrease in intervention areas). However, it is possible that decreases in both intervention and comparison areas would have been even steeper had the QIO- and non-QIO-sponsored QI efforts not been present.

**Does the Overall QI Environment Affect QIOs' Effectiveness in the CKD and Care Transitions Themes?** The provider environment did not appear to differentially affect the

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<sup>18</sup> The QIOs were not required to complete recruitment of partner providers until July 2009, nearly one year after the start of the 9th SOW.

<sup>19</sup> Among the 14 nephrology practices from which we drew practices to visit, 4 described themselves as highly involved with the CKD theme. Of the 4 we selected to interview, 3 considered themselves highly involved. Three of the 4 dialysis centers we interviewed were highly motivated, compared to 5 of the 6 in the original pool.

impacts achieved by QIOs for the measures in these two themes (see Volume II, Chapter II, Section F).

## H. Care Transitions Theme

### 1. QIO Partner Discussion and Site Visit Results

Of the officially partnered organizations (providers and collaborators) that were categorized by QIOs in eight selected states for the care transitions theme,<sup>20</sup> QIO theme leaders categorized 33 percent as “minimally involved,” while 26 percent were “somewhat involved,” and 42 percent were “very involved.” Therefore, for the theme to work in these states, the impact would have had to have occurred within the two-thirds of targeted organizations that actually participated actively in the theme.

We focused our telephone discussions on the group that the QIOs identified as “very involved” and those not categorized by the QIOs, in order to learn what kinds of changes took place among involved organizations.

Many (36/63) of the interviewed collaborators pointed to the enhanced level of communication between providers as evidence of the important contributions and influence of the QIOs and the care transitions theme.<sup>21</sup> All five of the visited QIO theme leaders discussed how this increased degree of communication has created more functional relationships between the facilities. Connections are being formed at the leadership level as described by one QIO director (see quotation). Increased dialogue between providers was also seen at the nurse level, as was described by a QIO theme leader where now, “rather than the previous procedure of faxing discharge information, nurses from the discharge and intake facilities would call each other on the phone to discuss patient care.” Beyond working to diminish the health care silos, partner organizations also identified improvements in medication reconciliation as an indication of the theme’s success. One provider discussed this expansion of activity within the care transitions collaboration and how previously the project was, “... only for readmission issues, however now it has spread to dialysis and medication reconciliation with the pharmacists. The project has grown through the original ideas. The group is trying to go one step back and complete a root cause analysis of why the frequent flyers go back to the hospital.”

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*“... The QIO introduced leaders from [a] hospital with leaders of the home health agency that worked with the hospital. After 10 years of working together, the two leaders of the organizations had never met.”*

*-QIO director*

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<sup>20</sup> There were 57 partner organizations that were not categorized. These uncategorized partners were concentrated in two of the eight states; no explanation was provided for why the theme leaders in those states chose not to fully respond to our request (perhaps they felt less comfortable than others with doing so).

<sup>21</sup> Although our interviewees do not represent a scientific sample, the number of interviews was large enough that counts of respondents endorsing particular views or activities provide a useful measure of the strength or extent of our findings.

With the QIOs' encouragement and guidance, partner organizations made operational changes within their facilities to increase their involvement within the discharge process. As is shown in Table V.9, the most common process changes made include: utilizing a transition coach (47/49), adopting a universal transfer tool (19/49), and scheduling post-discharge followup appointments with a health care provider (18/49). Many of the partner organizations reported that they had been interested in utilizing a coaching model before the 9th SOW and the QIO provided the motivation to assist the hospitals in actually implementing such a program. Once hospitals decided to implement a program, the Coleman Care Transitions model (Coleman et al. 2006 )was initially selected by the largest number of partner organizations (24/49). However, while QIOs in three states reported that several of their providers had wanted to use this model at first, they were unable to because of financial constraints or legal issues. Instead, they sought to implement alternative coaching models that were less labor intensive, such as Project Re-Engineered Discharge (RED) (Jack et al. 2009). The tools most commonly used within these programs were the patient or family member's post-discharge self management education (29/49), followup phone calls (29/49), and medication management (25/49). Four partner organizations relayed that scheduling frequent followup visits or calls immediately after discharge created a better relationship between coach and patient, increased patient awareness of potential issues that could lead to rehospitalization, and allowed the coach to quickly assess a patient's home situation.

**Table V.9. Care Transitions Operational Changes**

Operational Change	Number of Providers (49 total interviewed)
Adoption of universal transfer tool	19
Post-discharge followup established with a healthcare provider	18
Telemedicine	13
Use of Teach Back process	11
Personal health record	8
Increased use of EMR	7
Added care coordinators to staff	6
Transition coaching	47
Patient and/or caregiver educational training	29
Followup phone calls	29
Medication management	25
Home visit by provider	14
Patient and/or family empowerment	12

The QIOs assisted with the creation or adoption of universal transfer tools to create more efficient information transmissions during the discharge process.<sup>22</sup> In some instances, the QIOs created new instruments, such as a “heart failure passport” that was used to compile information about patients and send it across care settings. Other theme leaders reported assisting nursing homes in understanding and implementing the INTERACT tools, which is a documentation system that nursing homes can use as an aid to assist with information collection and distribution. Many partner organizations (19/49) chose to use these types of transfer tools to gather and disseminate patient information across the care spectrum.

## 2. Impact Estimates

We did not find any significant impacts of the QIO care transitions theme (Table V.10) for the three condition-specific readmission outcomes or the combined outcome. In addition, the magnitudes of the differences in regression-adjusted means for all four readmissions outcomes were small, no larger than about 1.4 percent. Upon performing propensity score matching on the 64 care transitions counties (that span 14 care transitions communities), we performed a difference-in-difference impact analysis with a logistic specification and estimated a patient-level model analyzing readmissions for all patients residing in these counties who had a qualifying index discharge.

Several factors might have contributed to the lack of overall significant impacts:

- Although the QIOs were expected to lower readmissions community-wide, only a limited number of hospitals agreed to work with the QIOs, potentially reducing the reach or penetration of the intervention. As shown in Table III.2 only 58 percent of providers that agreed to participate were active throughout the 9th SOW.
- In conjunction with the limited reach of the intervention, followup data available for this report might not have allowed sufficient time for efforts by QIOs to fully manifest. The data only include 12 months between the actual start of the intervention and the start of the followup period.<sup>23</sup>
- It is possible (although unlikely) that the QIOs successfully reduced other types of readmissions (perhaps those following discharges for orthopedic or surgical diagnoses, for example), with minimal effects on AMI, CHF, and pneumonia readmissions. AMI, CHF, and pneumonia readmissions represent only about 20 percent of all readmissions among Medicare fee-for-service (FFS) beneficiaries (Gilman 2010; Jencks et al. 2009), and many of the care transitions QIOs have been trying to reduce readmissions for essentially all acute inpatient discharges (Brock and Goroski 2010). However, one would expect that the QIO interventions, such as patient coaching, medication reconciliation, and arrangement of prompt post-discharge followup care, would have reduced all types of readmissions.

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<sup>22</sup> The CARE tool is one that CMS originally intended for every QIO involved in this theme to use it. However, CMS changed this plan in a contract modification due to setbacks in the tool’s readiness for implementation.

<sup>23</sup> The followup data used for this report cover the period from July 2009 to June 2010, or through month 23 of the 9th SOW, which is three additional months of data than what was used in the interim report.

**Table V.10. Estimated Impacts of QIO Care Transitions Efforts on All-Cause Readmissions: Regression-Adjusted Predicted Means at Followup (July 2009–June 2010) (Percentages)**

	Beneficiaries in Intervention Counties with CT Intervention	Beneficiaries in Intervention Counties Without CT Intervention (Counterfactual)	Difference	p-value
All-cause readmission following a discharge for AMI, CHF, or pneumonia	23.5	23.4	0.1	0.949
Number of beneficiaries	26,472	35,460		
All-cause readmission following a discharge for AMI	20.9	21.2	-0.3	0.698
Number of beneficiaries	5,284	7,501		
All-cause readmission following a discharge for CHF	27.9	27.5	0.4	0.582
Number of Beneficiaries	12,526	16,504		
All-cause readmission following a discharge for pneumonia	19.2	19.2	0.0	0.941
Number of Beneficiaries	10,317	13,565		

Sources: Medicare claims data as processed by Mathematica's Production and Implementation of Hospital Outcome and Efficiency Measures (PIHOEM) II project under contract with CMS, Area Resource File (2008), CHSI 2008 data.

Notes: For each measure of readmissions, predicted means are based on a multivariate logistic regression that controls for person-level characteristics and a few county-level characteristics that differed between intervention and comparison counties. The person-level control variables include age, gender, race, original reason for Medicare eligibility, and a multitude of indicators for chronic conditions that might affect the likelihood of being readmitted following an index admission for AMI, CHF, or pneumonia. See Table II.23 Chapter II, Section B of Volume II for the full list of control variables. The estimated means account for the weighting used in other analyses that addresses matching with replacement Volume II, Chapter II, Section B provides a more detailed explanation of the computation and interpretation of the estimated intervention and counterfactual means.

No impacts are statistically significant at the .10 level or smaller, two-tailed test

- There was likely at least some loss of fidelity as the care transitions communities tried to translate and replicate to their local environments and constraints the evidence-based interventions that the 9th SOW encouraged QIOs to implement. The Care Transitions Program (Coleman et al. 2006), Transitional Care Model (Naylor et al. 1999, Naylor et al. 2004), and Project RED (Jack et al. 2009) all have strong evidence of effectiveness, but were originally implemented in single institutions as research projects that ensured high fidelity to the interventions. For example, having nurse practitioners serve as the transition coordinators is a key part of the Transitional Care Model (Naylor et al. 1999, 2004) but is difficult to implement given the shortage of advanced practice nurses and their higher cost.<sup>24</sup>

<sup>24</sup> It is possible that other non-QIO initiatives to reduce hospital readmissions may have begun to affect both comparison and intervention areas, making it hard for QIOs to bring about large, additional effects. However,

(continued)

We note that a separate concurrent study conducted by the Colorado Foundation for Medical Care (CFMC) has found favorable impacts of the Care Transitions theme on readmission rates (Brock and Goroski, 2010). However, the results of the two studies cannot be compared because they examined different measures of readmissions and used different approaches to selecting comparison communities. Our study used 30-day all-cause risk adjusted readmission rates following index hospitalizations for AMI, CHF, and pneumonia. We decided with CMS to focus on these readmission measures because (1) they were listed in the 9th SOW as targeted quality measures for this theme, and (2) they are in widespread use. Based on the criteria of high volume, high rates of readmission, high inter-hospital variation in rates, and evidence of preventability, the Medicare Payment Advisory Commission (MedPAC) had included them in its suggested “starter set” of readmission measures for CMS to consider in piloting public reporting and payment reforms (Medicare Payment Advisory Commission 2007). For the same reasons, CMS subsequently chose readmissions following these three conditions for public reporting on Hospital Compare (QualityNet 2010). Under contract with CMS, Yale University has developed risk-adjustment models for the three measures, and the measures have been endorsed by the National Quality Forum and are publicly reported by CMS on the Hospital Compare website. These rates measure whether eligible beneficiaries have had at least one readmission within 30 days of discharge from the index stay. In other words, beneficiaries with one or multiple readmissions in the 30 day window are both counted as having had at least one readmission. In addition, the denominators for the readmission rates consist of beneficiaries discharged for the three conditions. In contrast, CFMC’s measure counts readmissions among beneficiaries discharged for any reason (not only for acute AMI, CHF, and pneumonia). Subsequent hospitalizations within 30 days are not only counted as readmissions, but are also considered index stays, so that beneficiaries may have multiple index stays and subsequent readmissions within the 30 day window. Finally, the rates are calculated using a denominator consisting of all Medicare beneficiaries residing in the community, not just beneficiaries discharged from the hospital.

Our study used a propensity score matching approach to find, from among all U.S. counties, comparison counties that matched most closely to the intervention counties on 28 county-level characteristics, including the baseline rates of the readmission measures and measures of health care provider supply, demographics, population health, poverty, and other socioeconomic indicators. We performed a beneficiary-level analysis with regression adjustment for beneficiary characteristics, including age, gender, and comorbidities. The CFMC matched comparison counties to intervention counties on three characteristics—a weighted mean of the Dartmouth Atlas’s Hospital Care Intensity index, county population, and county poverty distribution—using a measure of similarity based on the arithmetic differences in these characteristics. After determining representative hospital service area (HSAs) for each candidate county, CFMC then presented the candidate HSAs to the QIOs participating in the Care Transitions theme for input with regard to the final selection. Impacts were inferred by comparing aggregate, community-level, unadjusted rates in the intervention and comparison communities.

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*(continued)*

awareness of the problem of high rates of hospital readmissions among Medicare beneficiaries did not become widespread until later into the 9th SOW. For example, the widely cited article by Jencks et al. (2009) showing high rates of readmissions was not published until April 2009, and the Affordable Care Act, with its mandated payment reductions for hospitals with high rates of readmissions was not enacted until the spring of 2010.



**Are Certain QIO Approaches More Effective Than Others?** Both the High C–High I–High G and Medium C–High I–Low G approaches appear equally ineffective. The impacts on readmission rates for AMI discharges were slightly larger for QIOs that worked with a majority of providers they had previously worked with than for QIOs that did not ( $p < 0.10$ ). There were no other significant differences between the two subgroups.

**Does the Overall QI Environment Affect QIO Effectiveness?** The provider environment did not appear to differentially affect the impacts achieved by QIOs for the measures in these two themes, either.

## I. Core Prevention Theme

### 1. Site Visit Results

Of the 16 physician practices we visited who participated in the core prevention theme, all but two said that the QIO had influenced their use of EHRs and/or workflow to improve the percentage of their patients receiving appropriate preventive services. Among the remaining two practices, one did acknowledge that the QIO had been an influence pushing them to hire additional staff (now hired) to enable them to improve their performance. The other practice said that the QIO provided feedback reports but offered no other help. The 14 practices that made QIO-influenced changes commonly reported the following types of QIO-influenced changes (at least 3 practices each):

- Processing orders and results within an EHR to effectively to track whether results have been received for each order—a key to identifying patients who may not have followed through with the recommended services or is missing results, and to producing proper rates of services actually received rather than rates of services ordered.
- Outreach with letters or calls to patients who are found to be missing preventive services.
- Use of physician-level data on preventive services rates, such as talking with physicians whose rates appear particularly low, and/or displaying physician-level data for all in the practice to see.
- Using flags/reminders for missing preventive services in the medical records, to encourage the care team to address these during visits.
- Asking patients to update their preventive service information when they arrive for a visit.
- Generally increasing the practice’s focus on preventive services.

In addition, 4 practices noted that the QIO-influenced changes also helped them meet goals to achieve medical home status (3) or rural health clinic designation (1).

### 2. Descriptive Trend Analyses

Finally, the core prevention theme did not permit the creation of the statistically equivalent comparison group required to conduct impact analyses, so we performed a series of descriptive trend analyses. Detailed results are in Volume II, Chapter II, Section C..

The QIOs recruited a total of 2,489 primary care practices to the core prevention theme, 1,590 PPs and 899 NPs. Practices were relatively small, although the NPs tended to be somewhat larger, with four and six physicians per practice on average, for PPs and NPs respectively. PPs also had slightly higher percentages of solo and rural practices than NPs (about 28 versus 25 percent for solo practices and 32 versus 26 percent for rural practices). Somewhat more than 70 percent of practices reported their primary specialty as family practice and about 25 percent as internal medicine, with small proportions of general practice and geriatrics making up the remainder; there was little difference between PPs and NPs. The geographic distribution of PPs and NPs was also similar (Volume II, Chapter II, Section C).

PP and NP rates in mammography and rates of screening for colorectal cancer showed a slight increase over time, with no discernible difference between the two groups (Volume II, Chapter II, Section C). Rates of influenza and pneumococcal vaccinations for PPs and NPs also paralleled each other closely and remained relatively constant over time.

## **VI. EFFECTS ON HEALTH CARE DISPARITIES OF HOSPITAL SCIP/HF, NURSING HOME, CKD, AND CARE TRANSITIONS THEMES**

Prior studies have documented that beneficiaries belonging to racial and ethnic minority groups tend to receive poorer quality of care and experience poorer health outcomes than those in non-minority groups. Efforts to simultaneously improve overall health care quality among all beneficiaries, and to narrow health care disparities, would need to result in greater quality impacts among underserved beneficiaries than among non-underserved beneficiaries. We therefore conducted analyses to determine whether the 9th SOW themes may have had such differential effects. The 9th SOW considers underserved beneficiaries to be those who are African American, Hispanic/Latino, Asian/Pacific Islander, or American Indian/Alaska Native.

Because the data available for the SCIP/HF analyses did not contain race/ethnicity information at a beneficiary level, we used the Area Resource File to determine the racial/ethnic composition of the counties in which the hospitals analyzed were located. We examined whether the QIO theme intervention had differential impacts on hospitals in counties with high minority populations versus those with low minority populations. In contrast, we did have beneficiary-level information on race/ethnicity for the physical restraint, pressure ulcer, CKD, and care transitions analyses and examined their impact for beneficiaries belonging to underserved racial/ethnic groups and those who did not. (For the physical restraint and pressure ulcer analyses, we aggregated results up to the facility level, as explained below).

Overall, as detailed below, we found no evidence across any theme that the interventions had narrowed disparities or had any differential impacts on beneficiaries belonging to minority or underserved beneficiaries versus those who did not.

### **A. Hospitals: SCIP/HF Disparity Results**

For each county in the country, we calculated the percentage of the population that is composed of Hispanics and African Americans and designated the top tercile of the county-level distribution (counties in which 33 percent or more of the population is composed of Hispanics and African Americans) as high minority counties and all others as low minority.<sup>25</sup> Hospitals in high minority counties are only slightly more likely to be SCIP/HF PPs than those in low minority counties (see Volume II, Chapter II Section A Table II.3). The simple average values of the SCIP/HF measures for hospitals in high and low minority counties do show some evidence of disparities (Table VI.1), as average values at baseline for three of the measures (antibiotic use, hair removal, and venous thromboembolism [VTE] prevention) are worse for hospitals in high minority counties. Differences for these measures lessened somewhat by the follow-up measures, although mean rates were still lower in hospitals in high-minority areas.

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<sup>25</sup> For the great majority of counties, the proportion of Asian/Pacific Islander and American Indian/Alaska Native beneficiaries is very low, so we concentrated on beneficiaries belonging to the African American and Hispanic/Latino groups.

**Table VI.1 Change in Targeted Outcomes for SCIP/HF Theme Between Baseline (July 2007–June 2008) and Followup (June 2009–July 2010), By Hospitals in High or Low Minority Counties**

Variable	Hospitals in High Minority Counties N	Hospitals in High Minority Counties Mean (SD)	Hospitals in Low Minority Counties N	Hospitals in Low Minority Counties Mean (SD)	Difference Between Means of Hospitals in High versus Low Minority Counties
Perioperative Antibiotic Use <sup>a</sup>					
Baseline	985	87.5 (9.6)	2,335	89.3 (8.8)	-1.8
Followup	976	94.5 (6.1)	2,320	95.0 (6.1)	-0.5
Hair Removal					
Baseline	984	96.0 (9.3)	2,317	96.4 (9.7)	-0.4
Followup	979	99.3 (2.8)	2,318	99.2 (4.5)	0.1
LVSD ACEI/ARB					
Baseline	951	90.4 (9.7)	2,271	89.7 (11.6)	0.7
Followup	948	93.9 (8.3)	2,252	92.7 (10.7)	1.2
VTE Prevention <sup>b</sup>					
Baseline	981	82.1 (16.5)	2,318	85.8 (14.0)	-3.6
Followup	973	90.0 (13.2)	2,297	91.1 (11.3)	-1.1
Beta-Blocker Continuation					
Followup	969	89.3 (14.7)	2,174	90.7 (12.4)	-1.4

Source: Hospital Compare, 2008 Area Resource File

Note: LVSD ACEI/ARB=prescription of angiotensin converting enzyme inhibitor or angiotensin receptor blocking (ACEI/ARB) drug at discharge for patients with left ventricular systolic dysfunction (LVSD). VTE Prevention=use of recommended preventive measures for venous thromboembolism (VTE)

<sup>a</sup> Simple average of SCIP/HF measures INF-1, INF-2, and INF-3

<sup>b</sup> Simple average of SCIP/HF measures VTE-1 and VTE-2

None of the estimates are statistically significant at the .10 level or smaller, two-tailed test.

For each outcome, we conducted regression discontinuity impact analyses within each subgroup of hospitals and then examined whether these two impact estimates were statistically different from each other.

These results provide no evidence that the program has reduced race/ethnic disparities in quality of care (Table VI.2). For only one outcome, the LVSD ACEI/ARB measure, are the impacts statistically different for hospitals located in high versus low minority areas, and in contrast to what we would hope to see, this difference suggests a more favorable impact among hospitals in low rather than high minority counties. In the remaining cases, the magnitudes of the point estimates for impacts also tend to be larger (more favorable) for hospitals in low minority counties than high ones, but the pairs of impact estimates are statistically indistinguishable.

**Table VI.2. Estimated Impacts of the SCIP/HF Theme on Process-of-Care Outcomes, by Hospitals Located in High versus Low Minority Counties**

Outcome Variable	Estimated Impacts for Hospitals in High Minority Counties	Estimated Impacts for Hospitals in Low Minority Counties	Difference in Estimated Impacts
Perioperative antibiotic use <sup>a</sup>	0.86	-3.61 <sup>c</sup>	4.47
Hair Removal	0.35	0.83	-0.48
LVSD ACEI/ARB	-2.21	3.53	-5.74**
VTE Prevention <sup>b</sup>	1.84	5.20	-3.36
Beta-Blocker Continuation	2.84	5.64	-2.8

Sources: July 2007–June 2008 and July 2009–June 2010 Hospital Compare and 2008 Area Resource File. Provider-level covariates from March 2009 archive Hospital Compare.

Note: County-level covariate measures listed in Volume II Chapter II, Section A, Table II.3. N=475 for hospitals in high-minority counties and N=900 for hospitals in low-minority counties. The number of hospitals for each outcome variable analysis varies slightly due to missing data on outcome values or covariates.

Results are produced using a two-stage least squares regression discontinuity analysis, based on whether hospitals are above or below the J-17 threshold, using a bandwidth of  $\pm 15$  percentage points of the selection threshold. See Volume II, Chapter II, Section A for details.

<sup>a</sup> Simple average of SCIP/HF measures INF-1, INF-2, and INF-3

<sup>b</sup> Simple average of SCIP/HF measures VTE-1 and VTE-2

<sup>c</sup> Quadratic specification. All other estimates in the table are based on linear specifications. See Volume II, Chapter II, Section A for details.

\*Significantly different from zero at the .10 level, two-tailed test.

\*\*Significantly different from zero at the .05 level, two-tailed test.

\*\*\*Significantly different from zero at the .01 level, two-tailed test.

## B. Nursing Home Themes Disparity Results

We used resident-level race/ethnicity information in the Minimum Data Set (MDS) data set to categorize beneficiaries as either white or underserved minority, calculated separate nursing home-level average outcomes for the two groups, and conducted separate regression-discontinuity analyses for the sets of facility-level outcomes. We weighted these estimates by the number of residents from a particular group, rather than weighting all nursing homes equally, a decision driven by both methodological and substantive interests. Methodologically, many nursing homes have very few underserved residents. Giving those facilities the same weight as other facilities that have many more underserved residents introduces a great deal of noise into the data and reduces the stability of the estimates. Substantively, the approach is more sensitive to potential differing impacts on facilities that serve a higher proportion of racial/ethnic minorities, and produces average impacts on members of each group affected. We focused only on the primary targeted outcome for the respective themes (rather than also examining potential “spillover” effects of the themes as we did for the main impact analyses in Chapter 5).

The simple baseline and follow-up means do suggest the possibility of disparities, as rates for both outcomes are higher for non-white than white residents (Table VI.3).

**Table VI.3. Change in Targeted Outcomes for Physical Restraint and Pressure Ulcer Themes Between Baseline (July 2007–June 2008) and Followup (June 2009–July 2010), for Non-white and White Residents**

	Non-White Residents	Non-White Residents	White Residents	White Residents	Difference in Means Between Non-White and White Residents
	N	Mean (SD)	N	Mean (SD)	
Physical Restraint					
Baseline	11,189	4.4 (0.38)	14,140	4.2 (0.47)	0.3
Followup	11,326	2.7 (0.28)	14,134	2.6 (0.36)	0.1
Pressure Ulcers					
Baseline	10,344	14.5 (0.58)	14,090	11.6 (0.65)	2.9
Followup	10,602	12.8 (0.52)	14,108	9.8 (0.58)	3.0

Source: Minimum Data Set (Baseline: July 2007–June 2008; Followup: July 2009–June 2010).

No estimates are statistically significant at the .10 level or smaller, two-tailed test.

As Table VI.4 shows, for neither physical restraints nor pressure ulcers are the theme impacts statistically different between minority and white nursing home residents. As described elsewhere in this report ( Volume II, Tables II.5 and II.6), these themes were more likely to engage facilities with higher proportions of African Americans and Hispanics and thus had the potential to disproportionately affect the care of minority patients. However, among residents in participating facilities, the impacts on underserved minorities are not greater than for whites.

**Table VI.4. Estimated Impacts of QIOs' Work with Physical Restraint and Pressure Ulcer PPs, by Race/Ethnicity of Resident**

Outcome variable	Estimated Impacts for Minority Residents	Estimated Impacts for White Residents	Difference in the Estimated Impacts for Minority Minus White Residents
Physical Restraint Rates	-1.09	-2.26	1.17
Pressure Ulcer Rates	1.31	-1.02	2.33

Source: MDS data (baseline: July 2007–June 2008; followup: July 2009–June 2010) for outcome variables, data file provided by the Colorado Foundation for Medical Care for J-17 target list status, Nursing Home Compare (March 2009 archive) for provider-level covariates, 2008 Area Resource File for county-level covariates,

Note: Results are produced using a two-stage, least squares regression discontinuity analysis, based on whether nursing homes are above or below the J-17 threshold, using bandwidths of  $\pm 5$  and  $\pm 6$  percentage points for the physical restraint and pressure ulcer analyses, respectively, selection threshold. See Volume II, Chapter II, Section A for details.

No estimates are statistically significant at the 0.10 or smaller level, two-tailed test.

### C. CKD and Care Transitions Disparity Results

Because CKD and care transitions are beneficiary-level analyses, we first estimated impacts separately for minority and nonminority beneficiaries, and then tested whether these impact estimates were statistically different from each other. We found no statistically significant differences in the effects of either CKD or care transitions activities on the minority subset relative to the nonminority beneficiaries (Tables VI.5 and VI.6). Although statistically insignificant, the magnitude of the differential effect in rates of AV fistula placement (CKD3a

and CKD3c) was large; for CKD3a, the difference was about 17 percent (2.7 percentage points). This sizable difference might have been insignificant due to a small sample size in the CKD3 analyses.

For the rate of urinary microalbumin testing, we found positive and statistically significant impacts for both groups—that is, we found a positive effect of the program on both the minority and nonminority beneficiaries. There was no disparity in rates of testing at followup between the two groups. We found substantial disparities in rates of AV fistula placement (CKD3a and CKD3c measures) between the minority and nonminority beneficiaries. The rate (for CKD3a) was some 47 percent (7.6 percentage points) higher among the nonminority relative to minority beneficiaries. The disparity was also large for the CKD3c measure. For the rates of AV fistula placement (CKD3c), the impact of QIO activities on minorities was large (about 13 percent), and statistically significant at the 10 percent level; there was no effect on the nonminority beneficiaries (Table VI.5).

There were no statistically significant impacts on any of the four readmission measures for minority or nonminority beneficiaries. There was a sizable disparity in readmission rates between the two: all readmission rates were higher for minority beneficiaries. For example, the readmission rate following a discharge for any of the three index conditions was 14 percent (or 3.1 percentage points) higher among the minority beneficiaries compared to nonminority. The largest disparity was in readmission rates following a discharge for pneumonia with a 20 percent higher rate among the minorities (or 3.7 percentage points) (Table VI.6).

**Table VI.5. Estimated Impacts of QIO Efforts on CKD Quality of Care Scores for Underserved (Minority)<sup>a</sup> Beneficiaries: Regression-Adjusted Predicted Means at Followup (October 2009–September 2010) (Percentages)**

	Mean for Minority Beneficiaries in Comparison Counties	Estimated Impact on Minority Beneficiaries	Mean for Nonminority Beneficiaries in Comparison Counties	Estimated Impact on Nonminority Beneficiaries	Difference in Impacts for Minority Relative to Nonminority (p-value)
CKD1 Measure					
Received Microalbuminuria Test (CKD1a)	43.5	0.9***	43.9	0.7***	0.2 (0.318)
Number of Beneficiaries	136,658		520,856		
CKD3 Measures					
Received AV Fistula (CKD3a)	16.1	1.9	23.7	-0.8	2.7 (0.239)
Received Maturing AV Fistula (CKD3b)	19.0	2.7	20.0	1.5	1.2 (0.636)
Received either CKD3a or CKD3b Indicator (CKD3c)	35.1	4.6*	43.8	0.6	4.0 (0.176)
Number of Beneficiaries	1,575		2,445		

Sources: Medicare claims and enrollment data as processed for CKD quarterly analytic files, Area Resource File (2008), Community Health Status Indicators (2008) data.

Notes: Predicted means are from difference-in-difference regressions, adjusted for person-level and county-level characteristics (see Volume II, Chapter II, Section B (for details)). The estimated means account for the weighting used in other analyses that address matching with replacement. AV = arteriovenous.

<sup>a</sup> Underserved (minority) beneficiaries are of African American, Asian, Hispanic, or Native American descent. This is the definition of underserved used in the CKD analytic files. For consistency, we also use it in the care transitions analyses.

\*Significantly different from zero at the .10 level, two-tailed test.

\*\*Significantly different from zero at the .05 level, two-tailed test.

\*\*\*Significantly different from zero at the .01 level, two-tailed test.



**Table VI.6. Estimated Impacts of QIO Care Transitions Efforts on All-Cause Readmissions for Underserved (Minority)<sup>a</sup> Beneficiaries: Regression-Adjusted Predicted Means at Followup (July 2009–June 2010) (Percentages)**

	Minority Beneficiaries in Comparison Counties	Estimated Impacts on Minority Beneficiaries	Nonminority Beneficiaries in Comparison Counties	Estimated Impacts on Nonminority Beneficiaries	Difference in Impacts for Minority Relative to Nonminority (p-value)
All-Cause Readmission Following a Discharge for AMI, CHF, or Pneumonia	25.9	1.1	22.8	-0.1	1.2 (0.406)
Number of Beneficiaries	4,495		30,965		
All-Cause Readmission Following a Discharge for AMI	24.0	-0.9	20.9	-0.5	-0.4 (0.893)
Number of Beneficiaries	853		6,648		
All-Cause Readmission Following a Discharge for CHF	29.3	2.2	26.8	0.4	1.8 (0.350)
Number of Beneficiaries	2,308		14,196		
All-Cause Readmission Following a Discharge for Pneumonia	22.2	-0.2	18.5	-0.1	-0.1 (0.986)
Number of Beneficiaries	1,638		11,925		

Sources: Medicare claims data as processed by Mathematica's Production and Implementation of Hospital Outcome and Efficiency Measures (PIHOEM II) project under contract with CMS, Area Resource File (2008), Community Health Status Indicators 2008 data.

Notes: Predicted means are from difference-in-difference regressions, adjusted for person-level and county-level characteristics (see Volume II, Chapter II, Section B for details). The estimated means account for the weighting used in other analyses that address matching with replacement. AMI = acute myocardial infarction; CHF = congestive heart failure.

No estimates are statistically significant at the 0.10 or smaller level two-tailed test.

<sup>a</sup> Underserved (minority) beneficiaries are of African American, Asian, Hispanic, or Native American descent. This is the definition of underserved used in the CKD analytic files. For consistency, we also use it in the Care Transitions analyses.

## VII. INTERVENTIONS HIGHLY VALUED BY STAKEHOLDERS

This report has presented results on overall effectiveness for each theme, as measured by (1) reports by QIO managers, other QI organizations, physician practices, hospitals, and nursing homes, based on survey and site visit interviews and (2) program impacts estimated by the intervention group of PPs to a “statistically equivalent” group of comparison, or NP providers (for themes for which such analyses could be conducted). In this chapter, we discuss, theme by theme,<sup>26</sup> which interventions were especially valued by stakeholders and why. The discussion is based on information collected from the surveys of QIO directors and theme leaders; surveys of hospital QI directors and nursing home administrators; site visit interviews with QIOs, providers and key state stakeholders; and discussions with a large sample of QIO partners in the CKD and care transitions themes.

Although we consider each theme separately below, we first note important cross-theme commonalities and differences in the types of QIO activities that were most valued.

- **One-to-one assistance** to address provider-specific issues was most highly valued by nursing homes (participating in pressure ulcers, physical restraints, or NHIN themes), and physician practices (participating in core prevention or CKD themes), whereas **group learning activities** were most valued by care transitions partners (including providers of various types and other health care organizations) and hospitals participating in SCIP/HF.
- **Serving as a source of information** to respond to questions and provide information about government programs was viewed as an important role of the QIO by hospitals and physicians.
- **Tools** provided by the QIO were viewed as very helpful by hospitals, nursing homes, and physicians participating in the CKD theme.<sup>27</sup>
- **Comparative data reports** showing providers their own performance using graphics and benchmarks were found very useful across all provider types.
- **Sharing of best practices**, facilitated by the QIO, was frequently cited as key by hospitals and nursing homes.

### A. SCIP/HF

The following activities were most frequently reported to be “very valuable” by those who engaged in them, based on the hospital survey.<sup>28</sup>

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<sup>26</sup> Since QIOs’ activities in the MRSA theme were quite limited and focused on helping hospitals to report data to the National Healthcare Safety Network (NHSN) rather than on improving safety and quality, we do not discuss the theme in this chapter.

<sup>27</sup> Tools may take many forms and address many types of content areas but have in common that they can be used to improve care by health organizations or clinicians. In other words, they do not just describe how to improve care, as other resources may do, they are actually intended to be part of the process change to improve care.

<sup>28</sup> Hospital survey respondents were asked to rank various types of meetings with the QIO as very valuable, somewhat valuable, or not valuable.

- Attending broad-based regional or statewide meetings on quality improvement where the QIO was an active participant (69 percent)
- Assistance on reporting quality measures to CMS in order to receive the highest possible annual update to their payment (known during the study period as the Reporting Hospital Quality Data for Annual Payment Update or RHQDAPU and now known as the Hospital Inpatient Quality Reporting Program or HIQRP) (66 percent)
- Assistance with hospital-specific questions (66 percent)
- Hearing about best practices of other hospitals through QIO-sponsored activities (63 percent)

Even for the lowest-ranked activities—presentations to help create buy-in to quality improvement beyond the QI staff, and other staff development/training—42 and 48 percent (respectively) found these activities to be *very* valuable. Only 2 to 7 percent of the hospitals found each type of QIO activity they had experienced on the long list as “not valuable.” These hospitals reported the lack of value was most often because they already had the information or the topic was not applicable to the hospital’s specific situation.

Perhaps not surprisingly due to the small sample, the views of the hospitals that we visited on which QIO activities were especially valuable did not mirror the survey results. The most valued types of assistance reported by the hospitals we visited that mentioned at least one type included:

- Group sharing of best practices among hospitals (“it stirs ideas”) (5 of 11)
- Data reports with comparative benchmark data (these “were motivating”) (5 of 11)
- Having physician expert speakers present to the hospital’s physicians (which “really started to kick things into gear”) (4 of 11)
- Tools such as pocket cards for the anesthesiologists listing appropriate antibiotics (3 of 11)

In addition, one QIO that we visited felt its specific focus on encouraging hospitals to conduct concurrent review of patient charts was very valuable. Concurrent chart review enables hospitals to catch and remedy omitted care in the hospital SCIP/HF measures when it actually matters, during the relevant hospitalization (for example, a missing order for VTE preventive care following surgery), rather than finding such omissions weeks or months later during retrospective chart review, long after the patient has been discharged. Both hospitals we spoke with in that state agreed and had adopted concurrent review.

## **B. Physical Restraints, Pressure Ulcers, and NHIN**

Both QIOs and nursing homes identified several effective mechanisms used by QIOs for the physical restraints, pressure ulcers, and NHIN themes:

- Onsite assistance/one-on-one consultation, including engaging administration and nursing leadership
- In-person training for frontline staff

- Providing the facility with its performance data and comparative data from peers
- Sharing best practices and standardized tools

In addition, the following activities were valued specifically for particular themes:

- For the *pressure ulcers* theme, QIO and nursing home respondents in five states noted the value of getting nursing homes and hospitals talking to one another and sharing practices and information. For example, one theme leader explained that after a resident had been admitted to the hospital, the nursing home was able to communicate what pressure ulcer treatment strategies had already been tried so that it could move on to a more intensive intervention without wasting time or resources.
- For the *physical restraints* theme, QIO assistance on the proper coding of restraints in the Minimum Data Set (MDS) was reported to be a valuable activity by most nursing homes we visited (six of eight). While assistance to improve the accuracy of restraint coding did not necessarily lead to changes in care, confusion around coding was widespread, and in several instances, a facility's restraint rates improved once coding errors were corrected.
- For *NHIN*, QIOs emphasized the importance of developing QI infrastructure in these troubled nursing homes: helping to stabilize the environment through leadership development, improving teamwork through enhanced staff communication, and teaching facility staff how to use data to drive improvements. More than one QIO theme leader commented that this could be a slow process (see quote below).

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*“A slower process [for the most troubled nursing homes] allows the QIO to educate everyone from the top of the organization down and is much more sustainable ... we had to take the time to walk the nursing home step-by-step through the quality improvement process.”*

*-QIO NHIN theme leader*

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**On-site, one-on-one assistance, engaging leadership.** In-person consulting or on-site assistance by the QIO was viewed by nursing homes as the most effective way to work with them to achieve the nursing home-related theme goals. This type of assistance helped build necessary trust and rapport between the QIO representative, nursing leadership, and front-line staff. For physical restraints, nursing home site visit respondents found it most helpful for the QIO representative to provide in-person individual problem-solving assistance on a resident-by-resident basis. Nearly all QIOs stressed the importance of engaging administration, nursing leadership staff, and other members of the clinical team (LPN/LVN and CNA level staff) on the goal, in the process of the on-site assistance.

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*“Our facility could not get the same thing out of a class. The feeling that you talked to them [the QIO] as a colleague was very important. ”*

*-Nursing home DON*

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**Training for frontline staff.** In addition to one-on-one technical assistance, nursing homes were eager for more on-site, hands-on training for their frontline staff, along with actionable tools for dealing with the proper identification and treatment of pressure ulcers. Several visited nursing home staff with significant resource constraints requested that there be more intensive and more frequent education and training for frontline staff from the QIO. One director of nursing we spoke to found a video on skin care and pressure ulcer prevention and treatment provided by the QIO to be useful but also noted, “If they [the QIO] were available to do more hands-on training or in-services that showed staff how to float heels, how to apply the creams, etc., I would have latched on to that idea.” One QIO theme leader we visited had emphasized this strategy on the physical restraints theme (see quotation).

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*The biggest pot of gold we found was providing education to the frontline staff. We empowered them to be the ones who take off the restraints or don't let the restraints come on, or come up with ideas so that they don't have to use restraints.... We were breaking the barrier through education, and the leadership finally recognized that the frontline staff were the ones who needed education and that it can't be a trickle-down effect. The feedback from them [frontline staff] was phenomenal.*

*-QIO theme leader*

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**Sharing and discussing performance data.** Receiving feedback on quality performance from the QIO was seen as important to QI efforts by more than 90 percent of participating nursing home survey respondents. Nursing homes we visited echoed this, especially when QIOs presented data in an easy-to-follow visual format like charts or graphs. One QIO theme leader explained, “Many of the homes were small, rural, and didn't have any corporate resources. There were a couple of homes that when we shared the [comparative] data about where they were compared to the state, they were on the wrong side of the line ... this opened their eyes, like peer pressure.” A couple of QIO theme leaders found that providing nursing homes with an analysis of their own pressure ulcer data from the past six months led to the facilities acknowledging that they had more facility-acquired pressure ulcers than they had previously thought. Realizing this, nursing home staff were more motivated to make improvements to pressure ulcer care.

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*“When we shared the [comparative] data ... they were on the wrong side of the line ... this opened their eyes, like peer pressure.”*

*-QIO theme leader*

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**Sharing best practices and standardized tools.** Nursing homes also found that sharing best practices and standardized tools from the QIO could be easily reproduced and implemented by their staff were valuable. One QIO guided a nursing home to a online sharing session with nursing homes nationwide that allowed participants to ask questions of other homes and to glean best practices outside their region. Another nursing home QI manager valued a “device decision guide” provided by the QIO that helped determine what should or should not be coded as a restraint.

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*“We are wearing a lot of hats and if there is something out there that is a good practice, it is useful just to pass it along in a form where we can just implement it.”*

*-Nursing home QI manager*

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### C. Drug Safety

Unlike other themes, input to the evaluation of what activities were valuable to achieve drug safety theme goals comes only from visited QIO staff and their drug safety partner organizations in seven states. Insights on effective mechanisms include the following, as described by at least four of the seven QIOs that we visited:

- Creating and disseminating tools to physician practices was important (emphasized by five of the seven visited QIOs that implemented a drug safety intervention). This included a toolkit with wristbands to identify patients taking a potentially problematic drug (Warfarin), medication cards that patients could use to keep track of and share with their doctors all prescribed medications, and a “cheat-sheet” list of alternative medications to use in place of those that are potentially inappropriate.
- Face-to-face interaction with physician practices was also important. This included sharing analyses of physicians’ prescribing patterns to identify areas of improvement; helping physicians better use their EMRs to produce more useful medication data, which would feed decision supports to minimize drug safety incidents; and focus groups to show providers how to use a new e-prescribing tool.
- Sending educational mailings to patients and/or physicians and patients was important. The mailings contained information intended to lower the likelihood of drug-drug interactions by changing either patient or provider behavior, and aimed to generally increase dialogue about the prescription of the identified medication.

In addition, three of the seven QIOs we visited believed group activities contributed to the effectiveness of their work. One established a coalition on drug safety and coordinated an e-prescribing effort, and another provided educational conference calls with highly regarded speakers to discuss specific drug guidelines with nursing homes. The third QIO convened a technical expert panel of stakeholder organizations, physicians, and pharmacists to determine the most appropriate interventions for the state.

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*“The typical thing is for people to get a prescription from one doctor for [a potentially harmful drug], and then not to remember to tell the pharmacist or other doctors that they’re on it. The idea was that this campaign would motivate the patient to check with the doctor or the pharmacist.”*

*-QIO physician*

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Three QIOs mentioned the importance of involving a pharmacist in their drug safety work. The value of the pharmacist was variously noted as improving credibility of the project with providers, helping to ensure interventions were appropriate for the population being addressed,

and establishing guidelines that bridged differences between pharmacist and physician perspectives on e-prescribing.

#### D. Core Prevention

Physician practices found several activities or roles played by the QIOs to be particularly valuable in the core prevention theme:

1. Periodic data reports comparing the practices to a benchmark
2. Individual meetings between QIO staff and the practice
3. QIO's role as an information source regarding government programs

In addition, mixed comments on two approaches—collaboratives and Lean training<sup>29</sup>/workflow process analysis—are provided here as these approaches are likely to be considered in the future.

**Data reports.** Data reports were seen as motivating practices for improvement of preventive service measures, according to QIOs, community leaders, and eight practices. One provider noted, “For providers, it is a shameful thing not to have good numbers.” Another said the comparative reports “are a wake-up call.” In one case, a practice staff member was not able to follow the reports themselves, but she valued and acted on what the QIO staff said during routine discussions about these reports.

**Individual meetings with the practice.** Individual assistance on site from QIO staff—a method used heavily by QIOs—was highly valued. The QIO staff had effectively become a trusted source of information and advice for many practices we visited and had influenced the practice's culture or way of thinking in at least a couple of cases, which could benefit the practice's patients beyond the 9th SOW timeframe and measured improvements. These on-site QIO visits were valuable for effective communications with physicians and/or health IT staff, distribution of tools (such as a documentation template), and providing advice on specific methods to improve preventive service rates (such as generating reports of upcoming patient visits along with identifying missing preventive services).

**QIO's role as an information source.** Some practices highlighted the helpfulness of the QIO in explaining other government programs and medical home criteria. One commented, “One of the most important things [the QIO] does is help us understand all the programs coming down from CMS.” In three other cases, the QIO staff were specifically credited with helping the practice understand what it needed to do for the Medicare EHR Incentive Program (“meaningful use”), with strong QIO coordination with the Regional Extension Centers established to perform this helping role.

**Mixed views on collaboratives and workflow advice.** Practices and QIOs are mixed in their perception of the value of collaborative or group learning activities. On the positive side, two practices that did not have access to collaborative work through the QIO said they would prefer a collaborative, and another practice found an annual conference particularly helpful for networking. On the other hand, one QIO reported that the user group meetings they initially set

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<sup>29</sup> Originating with Toyota and adapted for use in the health care system, Lean is a set of tools and a process that helps organizations increase value by identifying and eliminating waste in their workflow.

up did not work well in their state, due to competitive feelings among practices, even when they were geographically distant from one another. One provider said she disliked group meetings because the participants tend to come with varying levels of understanding, which makes it feel inefficient, with less of the discussion relevant to her particular needs.

To improve care and even to produce accurate quality measures often requires redesign of workflows. However, QIO attempts to date to help physician practices implement such workflow redesigns may have fallen short of their potential. Two QIOs apparently tried to help practices build skills in this area, but it was not clear the extent to which the assistance was in-depth enough to make a lasting change. A major activity in one state was holding Lean training workshops, and both providers we visited there had used what they had learned to improve data collection processes on preventive measures and accurately represent care provided, but did not seem to have used the training in any other way. We heard that while the training provided an overview of how to use Lean, more in-depth training may have been needed. In another state, the QIO staff had visited a practice to analyze its workflow, which “helped open the doctor’s eyes to how the practice could be.” At the same time, this practice wanted the QIO to come more often and help them *actually improve* workflow.

## **E. Prevention Disparities**

Visited QIOs participating in this theme found that community outreach, to places like senior centers, was far more effective for recruiting patients to the diabetes self-management training (the main focus of this theme) than referrals through providers working on this theme. Also, one QIO focusing on a dense urban population believed a reason for marked improvement on its eye exam measure was the QIO’s having arranged for donated buses to transport seniors to 12 practices on three consecutive Saturdays to get their eyes checked.

## **F. Chronic Kidney Disease**

Many primary care providers interviewed for the evaluation pointed to the comparative data reports, beneficiary-related tools, and one-on-one assistance the QIOs provided under this theme as particularly appreciated forms of assistance. Several explained that the QIO-generated comparative data reports (based on claims data) motivated them to increase their urinary microalbumin screening rates. As they implemented changes, their actions were reinforced through the ability to view their progress in subsequent reports. However, some also commented that the lag of roughly half a year in the data furnished to the QIOs made the information less meaningful, and information that was actionable (e.g., lists of patients needing testing) would have been more helpful. In at least two cases, the QIO was able to train the provider to run more timely reports from the practice’s electronic medical records system.

Physicians also commented favorably on tools for beneficiary education provided by the QIO, with some commenting that they were useful in initiating conversations to teach patients about CKD and in conveying key CKD concepts to patients. Others noted that the materials were easy to understand or had excellent graphics. One-on-one assistance was mentioned as particularly valued by physicians in smaller practices, teaching them, for example, to more effectively use EMRs for monitoring CKD patients.

Several practices commented that routine lab reports on kidney function, provided as a result of the QIO’s activities, were useful to improving physician awareness of closely monitoring at-



risk patients. The physicians' diligence increased as they saw improvements in their testing rate and had positive experiences with patients whose eGFR improved.

Partnered organizations such as the Kidney Foundation and Area Agencies on Aging found high value in the QIOs' ability to form and support collaborations to improve CKD care quality. Many of these organizations reported that due to the QIO's neutrality, funding, informed staff, previously developed relationships, and understanding of the overall community, it was uniquely positioned to bring together competing groups in the health care community to work on issues such as CKD. In addition, the partner organizations complimented the QIO's ability to provide the group with structure and direction while still allowing the collaboration to be autonomous in determining how to best achieve their goals.

## G. Care Transitions

The QIO partners we interviewed, including providers and other health care organizations, believed the care transitions theme had improved patients' transitions across sites, and mentioned the following as contributing factors:

**Forming new relationships across providers.** Almost two thirds of care transition collaborators that were interviewed noted that in forming the community collaborative under this theme the QIO had a unique ability to bring the right set of individuals to the table and foster teamwork, accountability, and mutual understanding. Part of this ability comes from having appropriate staff within the QIO. One QIO theme leader said, "Sometimes the nursing homes struggle and try to say that this [readmissions] is not their issue, however the QIO has a nursing home administrator on staff that is good at getting the nursing home population to the table." The QIO's specialized position as a QI organization was also said to aid in creating functional collaborations. Forming these relationships among providers in a competitive environment was discussed by partner organizations as a major contribution by the QIO to the health care community. The resulting group brainstorming session about how to change the process to positively impact transitions across sites was seen as a positive strategy for change.

**Resource for educational material.** A little more than two-thirds of partners reported that the QIO was a valued educational resource, providing a spectrum of materials, templates, hosted webinars, sponsored seminars, and other care transition programs on best practices, provider training for coaching models, and a website with assorted tools and resources.

**Facilitated observation visit by key nursing home staff to nearby hospital.** One respondent from a post-acute care setting noted that as a result of participating in the QIO's project, they had visited the hospital partner, observed the discharge process closely, and better understood how to adapt their procedures to reduce the likelihood of readmission.

**Data reports.** The QIO provided data reports for the majority of respondents but some organizations did their own data analysis. Most respondents indicated that the data was timely though a number of responding partners noted that the time lag inherent in Medicare claims data made it difficult to assess progress and make any mid-course adjustments.

## VIII. SUGGESTIONS FOR PROGRAM IMPROVEMENT

Mathematica's independent evaluation of the QIO Program suggests potential improvements to five dimensions of the program:

- Positioning of QIOs in the quality improvement landscape
- Program design
- QIO operations and activities
- Measurement of QIO performance
- Evaluation of QIO Program as a whole

As noted below, several recommendations are consistent with CMS's recently published 10th SOW.

### A. QIOs and the Quality Improvement Landscape

#### 1. **The QIO program may be more effective if it is more closely aligned with other CMS and federal programs that address quality improvement, including health reform initiatives.**

CMS could position the QIO program as the primary technical assistance resource for its many programs, pilots, and demonstrations aimed at improving quality of care, including those designed for public reporting, value-based purchasing, and improving the coordination of health care, such as medical homes and accountable care organizations. Further, QIOs could serve as another source of technical assistance for meaningful use of EHRs under the Health Information Technology for Economic and Clinical Health (HITECH) Act. QIOs, with their longstanding relationships with physician practices and state medical associations, could significantly enhance the reach and capabilities of Regional Extension Centers program currently aimed at primary care physicians and critical access hospitals. Alternatively, with their foundation of work with nursing homes and home health agencies, QIOs could provide EHR technical assistance to these other providers that have received less attention.

An overall alignment could leverage the effectiveness of these programs, pilots, and demonstrations by supplying health care providers with more technical assistance than they currently receive, and also leverage the effectiveness of the QIO program by combining its technical assistance with the interventions of the programs, pilots, and demonstrations. This concept was independently suggested by several surveyed QIO directors who recommended that CMS review the interests of other federal agencies and organizations, and coordinate the QIO contract with those efforts (11 percent of responding QIO directors). Some motivated providers may already be using their work with QIOs to meet the requirements of other quality improvement programs. For example, one visited physician practice agreed to participate with the QIO in order to receive the data and information they needed about their patients to apply for a medical home designation.

By aligning the QIO program with other quality improvement efforts, CMS could reduce the extent to which QIOs and providers are pulled in multiple directions and thus incentivize provider participation. Across our site visits, we heard that providers are inundated with opportunities to participate in quality improvement activities, despite having limited resources for this purpose. Consolidating quality improvement efforts toward common, top priority themes would allow providers to participate with greater focus. Similarly, aligning QIOs' work with payment incentives would help capture providers' attention and give QIOs' greater leverage to both recruit providers and effect change. According to one provider, "I had to persuade the company to sign up because there was no financial gain in it. The financial gain was that they'd give us information that would help us improve quality so we'd get the financial gain from the payers."

Realigning the mission of the QIO program in this way may require a parallel realignment of the metrics by which QIO performance is measured and the skill mix of QIO staff and management. Achieving this latter goal would likely require QIOs to both recruit new and retrain current staff. This effort would benefit from CMS developing a new mechanism for QIOs to learn about the purpose, design, and logistics of Medicare's other QI programs, pilots, and demonstrations.

**2. The QIO Program may be more effective if it leverages existing knowledge of effective methods for technical assistance and rapidly generates new knowledge where needed.**

While our study found most of the QIO approaches to technical assistance were valued by providers, there was little effort given to understanding whether some approaches are more effective than others, and we heard that QIOs did not necessarily share freely or completely with each other as would be the case in an optimal national program designed to improve quality of care. Such efforts should take place during the SOW and involve the QIOs in learning and action collaboratives to benefit from each others' experience, and in conducting structured testing of different technical assistance approaches. Because existing literature does not provide enough answers (Paez, Stewart, and Felt-Lisk 2009), CMS could use the QIO program as a laboratory to test new approaches to rapidly increase uptake of proven quality and safety practices, and to improve the translation and scalability of effective interventions. The QIO program could also serve as a platform to test new quality metrics. This new role as a quality improvement laboratory would provide immediate and useful knowledge for the Medicare program to improve care for its beneficiaries, and simultaneously generate knowledge that benefits the larger health care system. For example, practical research could help sharpen approaches to the design and operation of the learning collaboratives that comprise an important part of the 10th SOW.

**B. QIO Program Design**

**3. Each QIO would be more effective if it were permitted to adapt its services and clinical areas to specific QI strengths and gaps in its state.**

Staff at several QIOs reported that their effectiveness was constrained by contractual requirements to focus on clinical areas where providers were already achieving high scores. Staffs at other QIOs reported feeling constrained by requirements to focus on clinical areas that were well covered by other QI organizations in their state. Increased flexibility could be implemented by requiring each QIO to submit an environmental scan and gap analysis for its

state, perhaps as a part of its proposal for the next SOW. CMS and the QIO could establish performance metrics appropriate to the QI gaps the QIO proposes to fill. Alternatively, CMS could establish a menu of focus areas for QIOs consistent with federal priorities, and allow the QIOs to select those that overlap with its state's priorities.

**4. QIOs may be more likely to have a measurable impact on quality of care if the period of performance of SOWs were increased to five years.**

Currently, QIOs are expected to bring about measurable change in outcomes within the first 28 months of the QIO Program. A five-year SOW will allow for a longer measurement period than the current three-year timeframe, and give QIOs more time to bring about changes in providers' actions that ultimately will improve outcomes measures. This change is supported by written comments of surveyed QIO directors, who suggested that QIOs needed a longer time period to achieve quality improvement (nine percent of responding directors). An alternative strategy would be to leave the period of performance at the current three years, but evaluate QIO performance based on rapid cycle mixed method, plan-do-study-act (PDSA) measures, rather than evaluating QIO performance on trends in provider quality scores.

**5. QIOs would be more effective if the QIO Support Center procurement cycle was shifted so that support centers were in full operation when a SOW began.**

Because QIO Support Centers are responsible for efficiently producing necessary tools and information to support the SOW, this suggestion addresses the problem that QIO theme leaders reported that the tools and materials that the QIOs needed were often not available when they were needed. This delay likely slowed early progress and resulted in duplicative efforts from individual QIOs.

**6. QIO's would be more effective if the program was able to provide QIOs more timely and reliable data for targeting and monitoring of their interventions.**

All visited QIOs discussed trouble with the late timing of data, problems caused by errors and associated recalls, and lack of details within data. As a result of these problems, QIOs lost resources and found it difficult to ascertain the current performance of providers. Nearly half of surveyed QIO directors (44 percent) expressed similar concerns about CMS' data processing.

**7. Feedback from CMS to QIOs would be more effective if CMS Government Task Leaders (GTLs) had more health care QI experience.**

Thirty-nine percent of surveyed theme leaders reported their GTL had a fair to poor knowledge base relative to their responsibilities, making it difficult for GTLs to understand the issues faced by QIOs and limiting GTLs' ability to help with problem solving. This finding was echoed in our site visits and by some surveyed QIO directors. As one QIO leader for the prevention theme explained, "The QIO is frustrated with the CMS staff. The theme leaders want to know if the CMS staff has ever tried to walk into a private practice and figure out what is going on." GTLs with more QI background would (a) facilitate timely actionable feedback to QIOs based on QIO progress reports (Suggestion 8), (b) allow flexibility for QIOs to adapt their QI strategies to state and local QI environment (Suggestion 3), and (c) provide alignment of QIO technical assistance with other CMS QI programs (Suggestion 1).

### C. QIO Operations and Activities

#### 8. QIO operations could be more efficient if the CMS reporting requirements were streamlined.

In nearly all visited states, QIO staff reported that the reports required by CMS could be streamlined and made more useful. Many also reported that they would welcome rapid-cycle, formative, constructive feedback from CMS on ways to improve their performance based on those streamlined reports.

#### 9. Future SOWs could test the effectiveness of expanding QIO direct training of provider staffs.

Although QIO theme leaders reported frequently using direct training of provider staff as an approach to technical assistance in the 9th SOW, our site visit interviews did not evidence this focus and suggested this method could be tested for effectiveness and expansion for both hospitals and nursing homes. Many provider staff interviewed commented that such training would be welcomed, because the staff pay more attention when an “outsider” instructs them, rather than the QI director. This is also consistent with survey results, in that surveyed 43 percent of nursing home respondents wanted the QIO to provide future support for clinical topics such as pressure ulcers or pain.

### D. Measurement of QIOs’ Performance

#### 10. For QIOs’ work with troubled nursing homes, a more comprehensive measurement of QIO performance would be more meaningful.

For the Nursing Homes in Need theme, several QIO officials and providers reported that the assistance needed did not match the performance measures applied to the theme because the facilities needed more general quality improvement support as a first step to improvement. Instead of measuring QIO work with troubled nursing homes through improvements on two specific measures (in the 9th SOW these were rates of pressure ulcers and physical restraints), CMS could structure a more meaningful composite measure, using experience it has developed in creating star ratings for nursing home quality and/or composites for a pay-for-performance demonstration. This would allow the QIO to work with the facilities as needed on problems associated with any of the larger set of measures in the composite. This is consistent with the suggestions of some surveyed QIO directors who said that supportive and consultative work to nursing homes should be expanded (11 percent of responding QIO directors).

#### 11. QIO performance metrics would be more meaningful if they take into account the small numbers of providers included in many performance scores.

In the 9th SOW, a QIO’s performance was based on the mean of the performance scores of a defined set of providers. Failing on any measure triggers CMS to consider consequences including not funding remaining work on the theme. The 9th SOW performance scores for some QIOs were computed on the basis of relatively small numbers of providers. CMS did not take into account the statistical precision of those scores during its evaluation of QIO performance. For most themes, CMS does allow QIOs “extra room” before considering them to have failed—for example, a QIO would fail the pressure ulcers measure only if improvement was below 70

percent of the target improvement. However, a better strategy may be allowing QIOs to focus only on those measures that are common enough in their state to produce reliable measurement (see suggestion 3).

## **E. QIO Program Evaluation**

### **12. Future evaluations of QIO program should focus on rapid-cycle, formative, mixed-method approaches.**

Traditional impact evaluation of the QIO program is limited by the fact that QIOs provide services jointly with other QI organizations as well as providing some services on a statewide basis. Rapid-cycle, formative, mixed-method evaluation methods would enable the QIO program to adopt the lessons learned more quickly than is possible with a more traditional evaluation approach. If CMS uses QIOs as a laboratory for testing alternative forms of technical assistance, the evaluation might benefit from an orthogonal design, which allows for the testing of several variants of technical assistance simultaneously (Brown and Zurovac 2011). Such an approach would be useful for testing different models (such as those to reduce readmission) or different sets of interventions that share the same outcome goal against one another, as long as the intervention is not statewide. This approach, however, would not solve the evaluation problem of QIOs having some impact on the comparison group or the difficulty of attributing impacts when QIOs team with other QI organizations.

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