September 2014

Evaluation of the Medicare Physician Hospital Collaboration Demonstration

Final Report

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

September 2014

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

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INTRODUCTION

1.1 Background

Under Section 646 of the Medicare Modernization Act of 2003, the U.S. Congress enabled the Centers for Medicare & Medicaid Services (CMS) to conduct a gainsharing demonstration program as part of the Medicare Health Care Quality Demonstration. The primary goal of the demonstration was to evaluate gainsharing as means to improve quality and reduce internal hospital resource utilization. This demonstration examined approaches to foster improvements in quality of care, and reductions in the overall costs of care, in and up to 90 days beyond the acute inpatient stay. The purpose of the evaluation was to analyze the impact of the Physician Hospital Collaboration (PHC) demonstration gainsharing models on hospital efficiency, physician practice patterns, Medicare expenditures, quality, and beneficiary satisfaction.

CMS solicited volunteer participating sites for the PHC demonstration and identified potential participants, consisting of multiple health groups and their affiliated hospitals, to participate in the demonstration. At the time of implementation, the only participant in the demonstration was the New Jersey Hospital Association (NJHA)/New Jersey Care Integration Consortium (NJCC) with 12 participating hospitals:

- Hunterdon Medical Center
- Holy Name Hospital
- Valley Hospital
- St. Francis Medical Center
- Our Lady of Lourdes Medical Center
- Somerset Medical Center
- Overlook Hospital
- Atlanticare Regional Medical Center
- Jersey Shore University Medical Center
- Monmouth Medical Center
- JFK Medical Center
- Centrastate Medical Center

The initial performance period for the demonstration ended in July 2012. Eight of the original 12 sites opted to participate in an extension period which operated from July 2012 through March 2013, and was intended to bridge the gap between the end of the PHC

demonstration and the start of the Bundled Payment For Care Improvement Model 1 which includes a gainsharing component. These 8 continuing sites were:

- Hunterdon Medical Center
- Valley Hospital
- St. Francis Medical Center
- Overlook Hospital
- Jersey Shore University Medical Center
- Monmouth Medical Center
- JFK Medical Center
- Centrastate Medical Center

1.2 Overview and History of the Gainsharing Model

Current trends in health care reform emphasize moving the health care system toward models that hold health care providers more accountable for the costs and quality of the care they provide, thereby encouraging greater efficiency and improved outcomes. The gainsharing model is one variant of these systems emphasized under health care reform. Gainsharing models developed in health care because of the misalignment of incentives between hospitals and physicians.[1] In the traditional hospital setting, physicians are independent agents who not only use hospital facilities, but can directly or indirectly, knowingly or unknowingly, affect hospital costs. Physicians may unknowingly increase hospital costs through unnecessary use of hospital resources (such as disposable surgical supplies) and inefficient use of hospital resources such as operating room time. Physicians may also knowingly increase hospital costs by, for example, ordering additional testing. Additional tests could be duplicative, inefficient, or both, but they are ordered because the physician may either always order that test or may feel the need to practice defensive medicine. Local practice patterns, not necessarily consistent with evidence-based or best clinical practice guidelines, may also influence physician behavior and lead to less-than-efficient clinical care.

Under the Medicare Fee-for-Service program, hospitals and physicians are paid separately for care provided in hospitals under Part A and Part B, respectively, which adds to the misalignment between the incentives facing hospitals and those facing physicians. Under the prospective payment system for inpatient hospitals, hospitals are paid a fixed amount, based on the principal diagnosis, which covers most of the associated hospital costs including those primarily under a physician's control. Meanwhile, Medicare generally pays physicians per procedure and, implicitly, for volume. There are no financial gains to physicians for providing more efficient care to lower hospital costs. A physician paid on a fee-for-service model who provides more services to a hospitalized patient will typically receive more in reimbursement.

[1] Gainsharing can also exist between payers and physicians as well as payers and patients.

Physicians also often control the use of supplies and selection of devices, which are paid for by the hospital. Consequently, physicians have limited incentives to use facilities and supplies efficiently or to bargain for greater efficiency.

Gainsharing is one potential solution to remedy this misalignment of hospital and physician incentives. In a hospital-physician gainsharing program, hospitals offer physicians a share of any cost savings achieved by the hospital as a result of change in physicians' behavior or decisions. Gainsharing works by providing physicians with a financial stake in controlling hospital costs. It is an arrangement in which internal hospital savings are shared.

Legislation: Gainsharing programs provide an avenue for improvement in efficiency which should result in savings to both hospitals and third party payers such as Medicare. However, gainsharing has had a slow start in federally funded health care due to the Civil Monetary Penalty Law (CMP)[2] and other statutes limiting the ability of hospitals to initiate and engage in gainsharing programs. We briefly discuss anti-fraud and abuse legislation and its relationship to gainsharing in the Medicare Gainsharing Demonstration Final Report. (Greenwald, et al 2014).

OIG-Approved Hospital-Physician Gainsharing: To implement a gainsharing model within the Federal health care system, hospitals must obtain waivers or exemptions from limiting regulations. The Office of the Inspector General (OIG) can offer a safe harbor exemption under the CMP. Any hospital desiring to implement a gainsharing program would need to have the OIG make a determination based on the specific facts of the program. We discuss this process and past OIG advisory opinions in Greenwald et al 2010 (Appendix to GS RTC).

Gainsharing in Medicare: The CMS' first attempt at model which includes some measure of hospital-physician gainsharing was in the Medicare Heart Bypass Demonstration, conducted between 1991and 1996. All seven Centers of Excellence (CoE) had waivers to engage in gainsharing, and groups designed and implemented more or less complicated gainsharing algorithms on their own, subject to CMS' final approval. Surgeons, cardiologists, radiologists, anesthesiologists, and pathologists all received fixed, negotiated payment amounts that were included in the hospital payment (no direct Part B inpatient billing of Medicare). Under this successful demonstration (Cromwell, et al., 1998), hospital costs were reduced (Cromwell, Dayhoff, and Thoumaian, 1997), physicians enjoyed gainsharing bonuses, quality improved, and no negative offsets to Medicare savings occurred as a result of shifts of care to the post-acute setting.

In 2001, the NJHA submitted an application to CMS to operate an eight-hospital demonstration of gainsharing in its state covering all-APR-DRGs (Marcoux, 2008). The application was approved by CMS in early 2004 as the Hospital Performance-Based Incentives Demonstration. The NJHA's proposed gainsharing methodology was likely the most complex ever proposed and introduced all the facets that other gainsharing proposals are likely to include. The New Jersey demonstration plan was to establish maximum pools from generated savings of Part A hospital savings for each All-Patient Refined (APR) DRG in the hospital and to share those savings with the medical staff. These pools were to be constrained to 25% of total Part B

[2] 42 C.F.R. Sect 1003.

outlays to be consistent with 42 C.F.R. 417.479, Requirement for Physician Incentive Plans. Next, the pools were to be converted to a per-discharge cost for each APR-DRG, which was based on average costs of the lowest 90% of cases (so-called best practice norms). Excluding the most expensive cases from the target baseline cost per discharge was the planned primary mechanism to achieve reductions in hospital costs. Once responsible physicians were identified, they would become eligible for gainsharing depending on how the average cost of their cases related to the mean cost of the 90% baseline group of cases. Baseline and demonstration cases were to be standardized for case severity and inflation. Gainsharing pools were to be carved out for hospital-based and consulting physicians to partially shelter them from lost billings associated with shorter stays and less testing. Process and outcome indicators were to be used to restrict gainsharing to physicians maintaining high quality standards. The PHC demonstration sites, as well as the Beth Israel Medical Center (BIMC) site for the related Medicare Gainsharing demonstration, have implemented gainsharing methodologies similar to those planned for NJHA demonstration.

The NJHA gainsharing demonstration differed from its predecessor, the heart bypass CoE demonstration, in that the latter put surgeons at risk for both Part A and B billings in a single global payment only for a few cardiac DRGs. (The NJHA demonstration planned to maintain separate Part A and B billing practices.) Also, physicians were to be put at risk for excessive post-acute care (PAC) Medicare outlays from any source (including outpatient physician services: "any absolute increase in Medicare PAC payments per discharge [must] be smaller than any absolute decrease in Part B inpatient physician payments per discharge" [Cromwell & Adamache, 2004]). The two demonstration models also differed in that CMS negotiated up-front discounts in its cardiac DRG global A and B rates, whereas New Jersey hospitals would have been expected to reduce baseline Part A and B inpatient outlays by 2% after adjusting for inflation and case mix changes.

The original NJHA gainsharing program did not last long; four New Jersey-area hospitals that were excluded from the demonstration project sought an injunction in Federal court to stop it. They argued that the NJHA's program was anticompetitive and that it violated the CMP and the Anti-Kickback Statute (AKS). In *Robert Wood Johnson University Hospital Inc. v. Thompson,* the U.S. District Court held that the demonstration did not violate the AKS. However, the court also held that, although CMS or the Health and Human Services Secretary may waive the Stark Law restrictions, neither CMS nor the Secretary may waive Civil Monetary Penalties. Nevertheless, CMS decided not to implement the demonstration.

Closely related to gainsharing projects, the Medicare Physician Group Practice (PGP) demonstration used a shared savings model and one of Medicare's first projects that established incentives for quality improvement and cost efficiency. It shared savings with physicians meeting these targets at the group practice level. A legislative mandate for the PGP demonstration was included in the Medicare, Medicaid, and SCHIP Benefits Improvement and Protection Act of 2000. It established several goals, including (Kautter, Pope, Trisolini, & Grund, 2007) (1) encouraging coordination of health care furnished under Medicare Parts A and B, (2) encouraging investment in administrative structures and processes for efficient service delivery, and (3) rewarding physicians for improving health care processes and outcomes. The PGP demonstration began on April 1, 2005 and ended April 30, 2013. Ten large multispecialty physician groups participated.

The Medicare Gainsharing demonstration, required by Section 5007 of the Deficit Reduction Act of 2005 concluded September 30, 2011. Two hospitals, BIMC in New York and Charleston Area Medical Center in Charleston, WV, originally participated in the demonstration, which evaluated gainsharing as tool to align incentives between hospitals and physicians to improve quality, reduce inpatient hospital cost and alternative ways that hospitals and physicians can share in efficiency gains. These two sites began implementation of the demonstration in October 2008. The Charleston Area Medical Center withdrew from participation as of December 2009. The PHC demonstration differs from the Gainsharing demonstration, which has a distinct hospital-based focus, in that there is an emphasis on participation in integrated delivery systems and on coalitions of physicians in collaboration with hospitals. The PHC demonstration also places a greater emphasis on improved efficiency and quality of care over a longer 90 day episode of care (as compared to a 30 day episode of care under the Gainsharing Demonstration), including post-acute services, beyond the acute-care stays.

The Acute Care Episode (ACE) Demonstration (also authorized under the MMA) is a 3-year demonstration that primarily tests the use of a global payment covering all Medicare Part A and Part B services for specified cardiovascular and/or orthopedic procedures. Five hospitals were selected to participate and began participation as of November 1, 2010. Gainsharing arrangements for participating sites and their physicians are allowed under this demonstration and four of the five participating sites have implemented gainsharing arrangements.

1.3 Overview of the Evaluation Design

For the evaluation of this demonstration RTI International worked with CMS, the Actuarial Research Corporation (ARC), and the demonstration sites to understand and document the performance of their demonstration models. RTI prepared a series of interim reports, culminating in this Final Evaluation Report. This Final Evaluation Report summarizes the hypotheses and research questions, methods, data collection, findings, policy relevance of the demonstration, and overall evaluation findings.

The evaluation addresses a range of research questions and to assess the effects of a variety of gainsharing models on

- hospital efficiency,
- physician practice patterns,
- Medicare expenditures,
- quality of care, and
- beneficiary satisfaction.

A summary of the primary analytic tasks follows.

Comparison Groups: CMS is using a trended-baseline methodology to determine whether participating hospitals have achieved budget neutrality and if there are changes in costs and quality of care during the demonstration. This model is often referred to as a difference-in-

differences model. Comparison groups are necessary because the demonstration applicants otherwise can only compare their own demonstration year experience to that of a base year (i.e., a simple pre/post analysis). Observing only pre-post differences does not control for changes experienced by similar non-participants during the demonstration period. One must observe both types of differences in order to determine the effects attributable to the gainsharing demonstration.

Using only the data from a demonstration's own experience cannot separate a participant effect from gainsharing effects. Therefore, RTI also compared performance of the demonstration sites with that of independent comparison sites not participating in the PHC demonstration. To select comparison hospitals and areas for the purposes of the evaluation, RTI

- identified selection, or matching, characteristics (e.g., area, urbanicity, area utilization patterns, bed size, teaching, ownership);
- developed a weighting scheme for these characteristics;
- identified a set of potential comparison hospitals that best matched the demonstration site according to the weighted criteria; and
- refined the list of potential comparison sites on the basis of comment from the RTI team, the implementation contractor (ARC), and CMS project and evaluation staff.

A complete summary of this completed task is provided in Section 3 of this report.

Site Visits and Physician Focus Groups: Site visits and physician focus groups were required under this evaluation contract. This qualitative data collection process documents and examines initial implementation and ongoing operations of the different gainsharing demonstration sites. Site visits were conducted for each of the 12 participating New Jersey hospitals between mid-January and early March 2012. We discussed the participation decision, details of the demonstration design, and initial and ongoing implementation; methods and evidence for cost reductions and quality impacts attributable to the intervention; and relationships with physicians and other providers. During the site visits, two waves of physician focus group discussions were also conducted. The goal of the physician focus groups was to gather information on physicians' experience and satisfaction with the gainsharing arrangements at their site. In these focus groups, RTI collected in-depth information on physicians' behavioral responses to incentives, the evolution of gainsharing methods at each site, and physician satisfaction with the arrangements, along with patient referral patterns and evidence of biased selection. A second and final round of site visits was conducted for 6 of the 8 remaining New Jersey hospitals during February and March 2013. A summary of the combined site visit findings are presented in this report.

Analysis—Implementation and Organizational Response Analysis: ARC, the implementation contractor, has lead responsibility for monitoring gainsharing arrangements and ensuring that payments adhere to the payment policies set in the demonstration protocols. The evaluation's analysis of organizational responses is qualitative and based on the site visits and physician focus groups. Issues that were investigated include

- overall perceptions of the PHC demonstration,
- rationale for participation in the PHC demonstration,
- perceptions of methods used to achieve savings and efficiency,
- changes in relationship between physicians and hospitals as a result of gainsharing,
- changes in clinical patterns of care (e.g., clinical pathways, shorter stays, fewer consults), and
- roles of physicians and hospitals in developing and monitoring changes in care delivery.

Analysis—Medicare Payments, Savings, and Budget Neutrality: The RTI evaluation of Medicare payments and savings overlaps to some degree with the responsibilities of the demonstration implementation support contractor (ARC), who has responsibility for determining whether the demonstration is budget neutral. RTI and ARC were jointly involved in analyzing financial reconciliation and quality performance. The RTI evaluation also

- described and critiqued gainsharing methods,
- determined financial impacts of gainsharing on providers,
- adjusted for patient severity and for substitution of PAC for inpatient care, and
- analyzed sources of Medicare savings: inpatient hospital compared with PAC.

Analysis—Quality of Care: A critical aspect of the evaluation was an assessment of whether quality of care has been affected by the gainsharing financial incentives. Quality-of-care analyses in the evaluation compared changes in quality measures for demonstration hospitals with those from comparison hospitals. Because all of these indicators were constructed from Medicare claims data, RTI had complete data for all 12 hospitals. Quality measures analyzed include

- inpatient and 30-day post-discharge mortality,
- readmissions within 30 days of discharge, and
- inpatient quality indicators (IQIs) and patient safety indicators from the Agency for Healthcare Research and Quality.

Analyses adjusted for patient severity using the APR-DRG risk adjustment grouper.

Analysis—Beneficiary Satisfaction: An important aspect of quality of care is patients' perspectives about the care they receive during their hospital stays. The Hospital Consumer Assessment of Health Plans Survey (HCAHPS) provides annual measures on patient satisfaction for participating hospitals. CMS made participation in HCAHPS a requirement for the

demonstration sites. We analyzed the difference in beneficiary satisfaction between demonstration and comparison hospitals before and after program implementation.

Analysis—Referral Patterns and Market Competition: The potential for additional incentive payments for physicians under gainsharing may affect the decisions physicians make, including increasing the probability of certain attractive patients' being admitted to a demonstration hospital by participating physicians. Participating physicians may also have an incentive either to transfer very costly and difficult-to-manage cases to other acute care hospitals (inpatient prospective payment system [IPPS] transfers) or to discharge them to PAC providers. Increased transfers might, in turn, result in a reduction in demonstration hospital outlier cases. To monitor these potential referral patterns and market competition impacts due to gainsharing, RTI conducted descriptive analyses that included tabulating and statistically testing differences between the demonstration hospital and its competitor hospitals (before and during the demonstration) using the following indicators:

- shares of more or less complex APR-DRG cases,
- emergency room admissions,
- overall transfers in and out,
- transfers of more or less complex APR-DRG cases, and
- outliers.

1.4 Outline of this Report

This report presents the complete performance analyses in the PHC demonstration and comparison sites for the original three year period of performance. Section 2 provides an overview of the gainsharing models implemented by the participating PHC NJCI Consortium demonstration sites. Section 3 describes in detail the comparison site selection process that forms the basis of our comparative and difference in difference analyses. These comparison sites were utilized by both the evaluation and implementation contractors for the quality of care, Medicare expenditures, savings and budget neutrality analyses. Section 4 summarizes the implementation and organizational response analyses, based on the two rounds of evaluation site visits and physician focus groups. Section 5 summarizes Medicare payment and utilization findings. Section 6 presents the quality-of-care findings for the demonstration and comparison sites. Section 7 presents beneficiary satisfaction indicators. Section 8 summarizes the referral patterns and market share analysis. Section 9 presents a summary discussion of findings.

SECTION 2
SUMMARY OF NEW JERSEY CARE INTEGRATION CONSORTIUM GAINSHARING MODEL

The New Jersey Care Integration (NJCI) Consortium consists of 12 hospitals located throughout New Jersey and is organized under the leadership of the New Jersey Hospital Association. The hospital membership includes teaching and nonteaching hospitals, stand-alone and system-affiliated hospitals, urban hospitals and hospitals located in more rural areas.

2.1 NJCI Demonstration Design

Eligible Diagnosis Related Groups (DRGs), Patients, and Physicians: The NJCI consortium includes all DRGs in their demonstration. Enrollment was voluntary for physicians. Physicians must have at least 10 admissions as a consortium member to be eligible for incentive payments. Only physicians who admit patients exclusively to the consortium member were eligible for the full incentive payment. Physicians who have dual admitting privileges (at a consortium and non-consortium hospital) had their incentive payments capped at their prior year's volume at the consortium hospital.

Gainsharing Strategy: The NJCI set a maximum incentive for each qualified all-patient refined DRG (APR-DRG) equal to 12.5 percent of the best practice variance, where

- Best practice variance=(actual spending − best practice cost)
- Best practice cost=average spending of the 25 percent of physicians with the lowest costs in hospitals[3]

Gainsharing Distribution to Physician: In the NJCI model, each patient was assigned to one practitioner who took take financial responsibility for the care of the patient. For medical patients, the "responsible physician" was the attending physician. For surgical patients, the responsible physician was the surgeon. Up to 12.5 percent of internal hospital savings were available for incentive payments. Payments consisted of two parts, a performance incentive and an improvement incentive. In the design for the initial year, improvement incentives were set as two-thirds of the gainsharing incentive payment pool and the performance incentive one-third. In Year 2, the improvement incentive share of the incentive payment pool was reduced to one-third, and the performance incentives comprised two-thirds of the incentive pool. By Year 3, the improvement incentive was eliminated and all incentive pool funds were directed to the performance incentives.

Performance Incentives: A physician's peer performance incentive was based on his or her average cost per case relative to the best practice cost per case of a cost-efficient peer group. The performance incentive was calculated at the case level for each admission. The following equation shows the computation of the performance incentive:

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[3] Based on hospitals across the state. Best practice norm costs are adjusted for differences in wage and teaching differentials to better reflect practice pattern differences.

$$PI = \frac{90^{th}\text{ percentile cost} - \text{MD's actual cost}}{90^{th}\text{ percentile cost} - \text{best practice cost}} \times \text{maximum payment} \quad (2\text{-}1)$$

If the physician's actual average cost per case was in the 90th percentile or higher, the performance incentive was equal to 0. If the physician was at the best practice cost, or better, the performance incentive was be the maximum payment. The best practice cost established a lower bound on gainsharing to discourage skimping on care.

To calculate the performance incentive, patient costs were averaged for each eligible physician, and then sorted from most to least costly. The 90th percentile cost threshold was the average cost cut-off point of the physicians spending in the top 10 percent, on average. The best practice cost was the 25th percentile cost threshold, that is, the least costly 25 percent of physicians' patients. If a physician's average cost was below the 90th percentile cost, then she or he was eligible for a bonus, or a fraction of the maximum potential payment. The fraction was determined by scaling the physician's cost savings in the numerator to the maximum allowed savings in the denominator. For example, if the 90th percentile=$15,000 and a physician's average cost is $12,000, while the best practice cost=$10,000, then the physician received 60 percent of the maximum payment.

$$\frac{\$15{,}000 - \$12{,}000}{\$15{,}000 - \$10{,}000} = \frac{\$3{,}000}{\$5{,}000} = 60\%\text{ of the maximum payment} \quad (2\text{-}2)$$

Improvement Incentives: The improvement incentive was present to compensate physicians because reducing Part A expenditures would result in reduced Part B expenditures (or loss of income). These were defined separately for medicine and surgery. For medical specialists,

$$\begin{gathered}\text{Base Year Case Mix Adjusted ALOS} - \text{Rate Year Case Mix Adjusted ALOS} \\ \text{X} \\ \text{Per Diem} \\ \text{X} \\ \text{Rate Year Admissions}\end{gathered} \quad (2\text{-}3)$$

And, for surgical specialists,

$$\begin{gathered}\left\{\text{Base Year Case Mix Adjusted Cost} - \text{Rate Year Case Mix Adjusted Cost}\right\} \\ \left\{\overline{\text{X}^{th}\text{ Percentile Base Year Cost}^{4} - \text{Best Practice Cost}}\right\} \\ \text{X} \\ \text{Case Mix Adjusted Maximum} \\ \text{Improvement Incentive} \\ \text{X} \\ \text{Rate Year Admissions}\end{gathered} \quad (2\text{-}4)$$

Improvement incentive algorithms differed between medical specialists and surgeons because surgeons control costs directly by ordering services from other doctors and are paid a fixed global fee; however, their fee is seldom affected. Medical specialists exert control over costs by determining the number of inpatient days. Shorter stays reduce hospital costs but also reduce physician fees.

Budget Neutrality Strategy: Under the Physician Hospital Collaboration (PHC) demonstration, total Medicare expenditures were the sum of inpatient prospective payment system (IPPS) payments (including outlier), physician Part B payments during the hospitalization, pre-admission provider payments, and post-acute care (PAC) services. The NJCI Consortium proposed to achieve budget neutrality through savings from

- decreases in the number of hospital inpatient cost outliers and higher number of transfers by reducing length of stay;
- reduced length of stays, reducing Part B payments to physicians; and
- reduced re-admission rates as a result of quality initiatives.

Shorter lengths of stay could lead to an increase in PAC use. As part of its quality initiatives, the NJCI Consortium monitored PAC use for congestive heart failure (3 and 14 days post discharge) and stroke (10 and 21 days post discharge).

Medicare Cost Impacts: Medicare savings were not required of the demonstration, only budget neutrality. However, the NJCI Consortium believed that, through improved quality and efficiency of care, the demonstration would produce savings to Medicare. On a hospital-by-hospital basis, the amount of savings may be offset by an increase in PAC use. However, the NJCI Consortium stated that if, when PAC expenditures were taken into account, Medicare expenditures increase, then that individual hospital would "commit to hold the Medicare program budget neutral".

Quality Assurances: The NJCI Consortium proposed a range of physician quality standards to ensure patient safety and quality of care. In addition, the Consortium tracked and reviewed the following parameters for any unusual or exceptional changes:

- Top 5 percent of physicians in terms of total incentive payment
- Top 5 percent of physicians by product line in terms of total incentive payment
- Changes in incentive payment of greater than 30 percent
- Changes in physician case mix index of more than 5 percent from the preceding year
- 10 percent increase in admissions
- 20 percent change in length of stay
- Physicians who qualified for incentive dollars, but did not meet quality parameters

In addition, the NJCI Consortium monitored several clinical quality measures as well as patient perspectives on hospital care through the Hospital Consumer Assessment of Health Plans Survey.

SECTION 3
COMPARISON HOSPITAL SELECTION

The hospitals participating in the Physician Hospital Collaboration (PHC) demonstration were self-selected. Since they were not selected through random assignment, the evaluation of the PHC demonstration used a quasi-experimental design to identify and quantify impacts of gainsharing. We analyzed participating hospital performance in quality, utilization, and cost measures in reference to targets, controlling secular trends that occur in the absence of the demonstration. These secular trends were assessed using a comparison group of hospitals, whose characteristics should be as similar as feasible to those of the participating hospitals. This model is often referred to as a difference-in-differences model. Comparison groups are necessary because the demonstration applicants otherwise can only compare their own demonstration year experience to that of a base year (i.e., a simple pre/post analysis). Unfortunately observing only pre-post differences does not control for changes experienced by similar non-participants during the demonstration period. One must observe both types of differences in order to determine the effects attributable to the gainsharing demonstration.

3.1 Methods and Selection of Comparison Hospitals

To select comparison hospitals to control for existing secular trends in Medicare payments, we sought to identify comparison hospitals in the same marketplace that had similar trends in average payments per episode and other similar characteristics. For the PHC demonstration, one comparison group was created, against which the performance of all PHC demonstration participating hospitals are compared

To select hospitals for the comparison group, our best available source of data was CMS's FY 2009 Impact File. Most of the data elements in this file were abstracted from FY 2006 and 2007 Medicare Cost Reports. They were supplemented with data from the New Jersey Hospital Association.

Selection Bias: An important issue that we faced in categorizing the PHC demonstration participating hospitals and then identifying similar comparison hospitals was the possible impact of selection bias. In the context of determining the effect of the PHC demonstration on Medicare payments per episode, selection bias is a technical term that refers to the possibility that the estimate of a PHC demonstration effect is potentially biased. This can arise if the participating hospitals may not represent all New Jersey hospitals.

One reason that participating hospitals may not represent all New Jersey hospitals is that the hospitals that submitted applications to participate in the PHC demonstration were self-selected. Another possible source of non-representation is the process that the New Jersey Care Integration (NJCI) Consortium used to select participants from the pool of applicants. However, after discussions with the NJCI Consortium, we believe that the principal source of potential selection bias is the pool of applicants.

Self-selection by the applicants, per se, need not result in biased estimates of the effect of the PHC demonstration on Medicare payments per episode. Specifically, if all of the factors that affect the decision to participate in the PHC demonstration *and* that affect the Medicare

payments per episode are measurable and are used in the statistical process that derives the PHC demonstration's impact on payments, then it is possible that selection bias is not present.

However, if there are unmeasurable factors (e.g., hospital managements' ability to control Medicare payments per episode) that affect both the decision to apply to the PHC demonstration and the level of Medicare payments per episode, then it is possible for the self-selection process to result in bias in the estimates of the impact of the PHC demonstration on Medicare payments per episode.

Therefore, we needed to be careful to identify any biased characteristics of the PHC demonstration hospitals and then consider these as much as possible in the comparison group. We discussed the application process and review with NJCI. RTI learned that hospitals with high shares of low income patients (i.e., high disproportionate share hospitals (DSH) were underrepresented among the hospitals that submitted applications to participate in the demonstration. RTI believes that high-DSH hospitals were less likely to submit applications because they might not have the financial wherewithal to undertake financial risks in the PHC demonstration. As a result, we considered DSH status as a factor in the comparison hospital analysis. Our goal was for the demonstration and comparison hospitals to reflect similar DSH status.

The selection bias issue also relates to the hospital organizational structure in New Jersey. Some hospital systems had more than one member that was interested in participating in the demonstration. However, it is not known how participants differed from their unsuccessful co-members. To the extent that the final selection of participants was not random, then the possibility that the unsuccessful members differ, in unknown ways, from the participants was taken into consideration through the identification of potential comparison hospitals. Non-participating hospitals within a single organizational system may also be influenced by spillover behavioral and other effects from a participating hospital. We determined that the most conservative approach would be to exclude any hospitals from systems with a hospital already participating in PHC demonstration from the comparison group.

On the basis of our empirical analysis of the DSH values of the PHC demonstration sites, we chose comparison sites reflecting similar levels. Additionally, in the event that a participating hospital is a member of a hospital system containing more than one short-term acute-care hospital, the nonparticipating hospitals of the system were excluded from the potential comparison group. Adoption of this criterion, we believe, reduces selection bias due to unobservable factors related to the decision-making process.

A primary criterion used to select comparison hospitals was that they were expected to experience similar pressures on expenditure and Medicare payment growth as the participants. This criterion was adopted because of the use of the trended baseline approach to setting the target used in measuring Medicare savings. In the absence of information on hospital-specific expenditure growth, we used information on hospital cost structures. That is, we expect that hospital cost structures are related to expenditure growth. We also expect that hospital cost structures are related not only to growth in Medicare inpatient payments but also to trends in post-acute care payments. Accordingly, nonparticipating hospitals that have cost structures similar to those of the participating hospitals were eligible to be assigned as comparison

hospitals. The use of such proxy measures is commonplace in evaluation (Shadish, Cook, and Campbell, 2002).

Selection Variables: The following variables were used as indicators of hospital cost structure: beds, Medicare case mix, residents per beds, residents, Medicare discharges, Medicare share of inpatient days, and operating DSH adjustment factor. Although some of these variables (e.g., interns/residents per bed) are related only tenuously to hospital costs per discharge, they are very much related to Medicare payments per discharge. Each of these variables is described in more detail below.

- **Number of short-term acute-care beds.** Although larger hospitals can achieve economies of scale by spreading overhead costs over a higher number of discharges (lower average costs per discharge), their average costs are typically higher than smaller hospitals. This is because larger hospitals practice a more intensive style of care, even after adjusting for case mix. This is due, in part, to physician demands for extensive testing and for newer (expensive) technologies.

- **Medicare case mix.** Sicker patients are more intensively treated and consume greater hospital resources than less-sick patients. A higher Medicare case mix results in higher costs per discharge, on average.

- **Intern/resident-to-bed ratio.** Advanced residents are sufficiently efficient to largely offset the inefficiencies of first-year residents. Even though the indirect medical education (IME) adjustment is based on disputed empirical evidence of the effect of intern/resident-to-bed ratio on Medicare costs per discharge (cf. Dalton and Norton, 2000), Medicare inpatient prospective payment system (IPPS) payments include an IME adjustment. Changes in IME rates may affect changes in overall Medicare payments per hospitalization and per episode.

- **Residents.** Although the number of residents may seem redundant with the intern/resident-to-bed ratio, we have found an independent scale effect in other similar Medicare hospital cost analyses, and therefore we have included this factor.

- **Medicare discharges.** Large numbers of Medicare patients require that hospitals have the resources to treat such patients. Medicare patients are more costly to treat, on average, than nonelderly, privately insured patients.

- **Medicare share of inpatient days.** Independent of the number of Medicare patients, hospitals with higher Medicare shares will have a more expensive cost structure than hospitals with a smaller share.

- **Operating DSH adjustment factor.** As noted by MedPAC (2007, "many observers have shifted to arguing that the adjustment subsidizes uncompensated care provided to the uninsured and underinsured." Nonetheless, high-DSH adjustment factors indicate relatively weak financial resources, and as noted previously, the indicator was relevant to potential selection bias issues in the PHC demonstration.

3.2 Designation of Comparison Hospitals

On the basis of this analysis, we designated select comparison hospitals that, as a group, were similar to the participant group. Nonparticipating hospitals had to have DSH of 0.20 or less, partly because of biased selection concerns that high-DSH hospitals were unlikely to participate as demonstration sites. We required that potential comparison hospitals have at least 150 acute-care beds to be selected. These two restrictions, along with the restriction that nonparticipating hospitals belonging to the same system as a participant could not be included in the comparison group, proved to be sufficient to identify a comparison population. We then used values for the other variables described above to verify the similarity of the comparison group to the participating hospitals.

For the participating and comparison hospitals, the individual and group values of the selection variables are shown in ***Tables 3-1*** and ***3-2.***

Table 3-1
Selection criterion analysis for participant hospitals

Provider Number	Name	Residents	Beds	Medicare discharge	Medicare case mix	Residents per bed	Operating DSH adjustment factor	Medicare share of inpatient days
310005	Hunterdon Medical Center	16.73	168	3,294	1.34	0.100	0.000	0.545
310008	Holy Name Hospital	0.00	284	6,243	1.35	0.000	0.040	0.642
310012	Valley Hospital	0.00	412	11,450	1.56	0.000	0.000	0.582
310021	St. Francis Medical Center	25.93	170	2,824	1.63	0.153	0.030	0.496
310029	Our Lady of Lourdes Medical Center	32.01	370	6,999	1.76	0.087	0.113	0.510
310048	Somerset Medical Center	18.28	256	6,647	1.38	0.071	0.000	0.542
310051	Overlook Hospital	58.04	373	6,311	1.51	0.156	0.000	0.527
310064	Atlanticare Regional Medical Center	40.81	468	8,991	1.53	0.087	0.132	0.467
310073	Jersey Shore University Medical Center	79.53	421	10,567	1.74	0.189	0.052	0.505
310075	Monmouth Medical Center	94.78	280	3,888	1.42	0.339	0.147	0.362
310108	JFK Medical Center	27.25	341	7,387	1.40	0.080	0.000	0.558
310111	Centrastate Medical Center	15.85	239	6,448	1.24	0.066	0.026	0.523
—	Unweighted mean	34.10	315	6,754	1.49	0.111	0.045	0.522

Table 3-2
Selection criterion analysis for comparison hospitals

Provider Number	Name	Residents	Beds	Medicare discharge	Medicare case mix	Residents per bed	Operating DSH adjustment factor	Medicare share of inpatient days
310001	Hackensack University Medical Center	113.23	656	15,007	1.74	0.173	0.031	0.431
310010	University Medical Center at Princeton	35.90	231	4,882	1.27	0.155	0.000	0.539
310017	Chilton Memorial Hospital	0.00	236	5,052	1.38	0.000	0.000	0.584
310022	Virtua West Jersey Hospitals Berlin	24.05	525	10,274	1.32	0.046	0.000	0.431
310025	Bayonne Hospital Center	0.00	246	3,517	1.42	0.000	0.051	0.671
310039	Raritan Bay Medical Center	27.01	402	7,392	1.26	0.067	0.134	0.565
310044	Capital Health System-Mercer Campus	5.00	212	2,603	1.35	0.024	0.194	0.430
310045	Englewood Hospital and Medical Center	47.18	283	6,601	1.62	0.167	0.033	0.557
310047	Shore Memorial Hospital	0.00	296	5,086	1.34	0.000	0.032	0.550
310050	Saint Clare's Hospital	0.00	347	6,649	1.24	0.000	0.000	0.509
310054	Mountainside Hospital	62.70	185	5,071	1.42	0.339	0.000	0.667
310057	Virtua Memorial Hospital of Burlington County	6.87	300	6,079	1.44	0.023	0.000	0.435
310070	Saint Peter's University Hospital	82.82	423	6,028	1.45	0.196	0.069	0.366
310081	Underwood Memorial Hospital	13.80	205	5,524	1.24	0.067	0.000	0.582
310086	Kennedy Memorial Hospitals-University Med Center	140.00	428	9,760	1.28	0.327	0.076	0.506
310092	Capital Health System-Fuld Campus	28.21	155	2,688	1.42	0.182	0.141	0.514
310112	Bayshore Community Hospital	0.00	161	4,087	1.33	0.000	0.000	0.617
—	Unweighted Mean	34.52	311	6,253	1.38	0.104	0.045	0.527

Cape Regional Medical Center and South Jersey Healthcare Regional Medical Center were excluded from the list of comparison hospitals because they are located in areas of New Jersey that do not face the same competitive pressures as the participants. Additionally, Deborah Heart and Lung Center was excluded because it specializes in cardiac and pulmonary cases, and therefore would not have the same DRG mix as the PHC demonstration participant hospitals. This hospital also had the highest adjusted Medicare case mix index, with a value of 2.79—the next highest in New Jersey was 1.93—and appeared to be an outlier in terms of case mix. Later during the analysis period, we dropped Bayshore because it was acquired by Meridian (which owns a participant hospital, Jersey Shore. Virtua West Jersey Hospital was also eliminated from the comparison group because we learned that it did not in reality meet our selection criteria (the facility only has 95 medical/surgical beds, not the 525 beds reported in the CMS Impact File. ***Table 3-3*** shows the city and county for each hospital in our final list of 15 comparison hospitals.

Table 3-3
Comparison hospitals

Provider number	Hospital name	City	County
310001	Hackensack University Medical Center	Hackensack	Bergen
310010	University Medical Center at Princeton	Princeton	Mercer
310017	Chilton Memorial Hospital	Pompton Plains	Morris
310025	Bayonne Medical Center	Bayonne	Hudson
310039	Raritan Bay Medical Center	Perth Amboy	Middlesex
310044	Capital Health—Mercer Campus	Trenton	Mercer
310045	Englewood Hospital and Medical Center	Englewood	Bergen
310047	Shore Memorial Hospital	Somers Point	Atlantic
310050	Saint Clare's Hospital/Denville	Denville	Morris
310054	Mountainside Hospital	Montclair	Essex
310057	Virtua Memorial Hospital Burlington County	Mt. Holly	Burlington
310070	Saint Peter's University Hospital	New Brunswick	Middlesex
310081	Underwood-Memorial Hospital	Woodbury	Gloucester
310086	Kennedy Memorial Hospitals—University Medical Center	Cherry Hill	Camden
310092	Capital Health—Fuld Campus	Trenton	Mercer

NOTE: Of the 52 nonparticipating hospitals, the following types were excluded from the comparison group: hospitals with fewer than 150 short-term, acute-care beds; hospitals with disproportionate shares of low-income Medicare patients (greater than 20 percent); and hospitals belonging to the same hospital system as participants.

SECTION 4
IMPLEMENTATION AND ORGANIZATIONAL RESPONSES TO GAINSHARING: SITE VISIT AND FOCUS GROUP FINDINGS

4.1 Overall Approach and Methods

RTI conducted a series of site visit to the participating Physician Hospital Collaboration (PHC) sites. Site visits were conducted in two rounds. The first round of site visits and physician focus groups were subsequently conducted in January, February and early March 2012.

RTI conducted a second round of site visits and physician focus groups for the 8 sites that elected to extend their demonstration performance period beyond the original end date of July 2012. The purpose of the extension was to bridge the time gap between the end of the Physician Hospital Collaboration (PHC) and the start of the BPCI Model 1 bundled payment program (which had many similarities in design to the PHC Demonstration). This second round of site visits and physician focus groups were conducted in February and March 2013. Ultimately, only 6 of the 8 extended sites agreed to participate in this second round of visits and focus groups. We conducted second round site visits and physician focus groups at:

- Hunterdon Medical Center
- Valley Hospital
- Jersey Shore University Medical Center
- Monmouth Medical Center
- JFK Medical Center
- Centrastate Medical Center

All specific interview schedules in both rounds were coordinated by individual hospital sites based on specific discussion guides forwarded to sites by the RTI team. In most sites, we conducted interviews with the following hospital site staff: (1) Chief Operating, Quality and/or Medical Officers, (2) Demonstration project leadership, (3) Chief Financial Officers, and (4) Demonstration Steering Committee members. Site visit interviews were supplemented by participating physician focus groups conducted during the same days the RTI team was on site. Hospital site coordinators contacted and invited potential physician focus group participants. We set a goal of 10 – 15 physicians recruited for each of the site physician focus groups. Actual physician focus group sessions ranged from 2 to 12 participating physicians. In total, across all physician focus groups, we spoke with 98 participating physicians in round 1 and 40 participating physicians in round 2. Discussion guides were used by the leaders of both the interviews and focus groups to structure each session. Designated note takers recorded the feedback gathered in each session.

The remainder of this section summarizes the findings from rounds 1 and 2 site visits and focus groups. Round 2 findings are presented in more detail as they represent the more recent discussions. Additional detail for round 1 is available in RTI's Year 1 implementation Report.

4.2 Round 1 Site Visit and Focus Group Summary

Rationale for Organizational Demonstration Participation: One key topic of conversation across our round 1 site visits was the hospitals' rationale for participating in the PHC Demonstration. Hospital leadership generally viewed gainsharing as a low risk initiative despite the requirements for overall Medicare program budget neutrality. The Demonstration was seen as an opportunity to get physicians "on board" with hospital-driven cost and quality goals through programs that some hospital sites had either implemented or were in the process of implementing independently from gainsharing. Many sites were clear that they participated in the PHC demonstration to attempt to better align physician and hospital financial incentives.

Some of the hospital leadership we interviewed viewed the PHC demonstration as an educational opportunity for physicians. These individuals noted that some of their admitting physicians were never required to look at how many hospital resources they were consuming or what they were spending on some admissions. Some leadership staff believed the physicians wanted to "do right by the hospital" but really had no idea about how much devices, testing and other resources actually cost. A few hospitals believed a culture or "habit" existed where each individual physician believed they could access whatever supplies or resources they wanted without consideration for costs. All of the participating hospital leadership saw the PHC gainsharing model as the serious start of the "cost and quality conversation", resulting in an ongoing change in the way physicians practice in the hospital setting.

Reduction in the length of inpatient stays was the most commonly cited specific goal set by participating hospital leadership, and was almost universally the highest priority. Other specific cost reduction goals included: more efficient use of operating rooms and reductions in turnaround time, cost effective use of critical care and telemetry units, improved quality and timeliness of medical records and related documentation, and streamlined selection of medical devices.

Rationale for Physician Participation: Most physicians we spoke with in the round 1 focus groups considered participation in gainsharing a "no risk" proposition. Once the project was described, physicians generally agreed to participate because they perceived they had nothing to lose. Many participating physicians believed they already practiced high quality, efficient medicine in the hospital setting and expected that little would change except that "we would get a check." One doctor likened participation in gainsharing to "getting a free Ipad with no repercussions." Despite this common perception that physician behavior wouldn't change, many of these same physicians who participated in our focus group then went on to describe changes – some subtle, some substantial -- they had in fact made to their practice patterns as a result of gainsharing.

Physicians learned about the gainsharing program in their hospital in different ways. According to the physicians who participated in our focus groups, most were introduced to the gainsharing program through some kind of meeting sponsored either by their department chair or

hospital leadership. Physicians in two hospitals noted that the gainsharing project was advertised aggressively to physicians through emails, faxes and letters. One hospital placed posters in physician break areas to encourage participation. A few hospitals called individual physicians who they thought could benefit from the program to get them on board. Additionally, some department heads reached out to their practice groups.

All of the physicians we spoke with in the round 1 focus groups were clear that participation in the gainsharing program was voluntary. Almost all the physician focus groups mentioned that the hospital leadership told them there was no financial risk associated with participation. Other rationales for gainsharing participation were:

- "The idea made sense- physicians have to start working with the hospital"
- It was another way physicians could assess their performance.
- "My department head had convinced me to sign up"
- The incentive payments were a nice acknowledgement for their work.
- Measuring physician performance is coming anyway; it's inevitable.

Both the leadership and the physicians in some of the participating hospitals noted physicians were hesitant to join at first. In these cases, skepticism was a common reaction and several physicians thought gainsharing seemed "too good to be true." Some physicians found it somewhat offensive to be paid for what they were supposed to be doing anyway. In about half of the hospitals, leadership noted a dramatic increase in participation after the first checks were distributed and the physicians saw that the rewards were "real." For instance, one hospital mentioned a 30% increase in physician participation once the first checks were distributed.

The leadership in many of the hospitals struggled to find a reason why some physicians elected never to participate in the gainsharing program. Ultimately, hospital leadership and physician colleagues believed non-participating physicians were just skeptical of the gainsharing concept. Physicians in two hospitals suggested that participating in gainsharing would give the government more data and would serve as another means to be scrutinized. Some physicians thought there was nothing that could make them change their behavior since they were practicing good medicine anyway. One hospital thought physicians were indifferent or just did not get around to signing up. Another hospital noted that a neurosurgery group decided not to participate because it felt that the financial incentive was not enough to compensate for their time. In about a third of the hospitals, we heard from physicians that implications for medical malpractice were a concern. These New Jersey physicians worried that if their patients heard they were receiving incentives to lower costs, and in particular maybe encourage shorter lengths of stay, physicians might be open to increased malpractice suits. Physicians who made this comment were clear that this was a perception problem and physicians were in no way being encouraged to get patients out of the hospital more quickly if that decision wasn't completely appropriate clinically. Still, they were concerned about how gainsharing might "look" to patients, even if the program was misinterpreted. Some physicians overcame this concern; some did not and never participated though the latter group was in the minority.

Summary Assessment of Year One Early Demonstration Impacts: In our first round of site visits, the definition of success for each site in the PHC Demonstration varied somewhat across the hospitals. With only one site as an exception, hospital leadership believed the financial incentive offered through the program "brought physicians to the table" in a way that had not been possible in the absence of the project. In this majority view, the gainsharing financial incentives made physicians more willing to meet with leadership, more willing to talk about costs, and more willing to review their individual performance data. For a few hospitals, this big-picture definition of success was more focused on creating a foundation for a collaborative culture rather than a specific focus on the amount of savings generated in the short run.

About a third of hospitals reported during round 1 that the PHC Demonstration did not result in net overall savings to the hospital once all the direct and indirect costs of the project were considered. Even for these sites, with one exception, the leadership of the hospital still viewed the improvements in physician-hospital relationships as worthwhile. However, the explanation we received on the lack of overall net hospital savings was that, because the PHC gainsharing methodology accrued savings at the individual physician level for admissions with positive results, but did not subtract from the gainsharing pool losses from admissions that did not reduce costs, in some cases – at the hospital level – there weren't any (or were few) savings left for the institution once the physician gainsharing incentives were distributed.

Another contributor to this early perception was the necessary reliance on cost-to-charge ratios to estimate the gainsharing incentives pool. Participating hospitals with more sophisticated internal costs monitoring systems in some cases reported that their actual reported internal cost analysis yielded different result from the cost-to-charge ratio method. Leadership from one site told us that while the PHC demonstration did reduce lengths of stay and accrued gainsharing incentives for some participating physicians, this resulted in a lower than optimal occupancy rate in the hospital; hospital beds remained empty, not generating revenue while still consuming some fixed costs. In this way, net hospital savings weren't generated. Finally, leadership from some hospitals perceived that the physician gainsharing incentives generated resulted mostly from structural changes made by the institution rather than from changes in the physician behavior. This wasn't always viewed as a negative, and most hospitals who reported this still felt the project was worthwhile in at least raising awareness and fostering communication with physicians.

Overall, nearly all the hospitals said the concept of aligning incentives is very positive, even if their overall estimate of the net financial impacts of the project were not entirely successful at their facilities.

4.3 Round 2 Site Visit and Focus Group Summary

Overall Assessment of Demonstration Participation: For the second round of discussions, we focused on perceptions of the successes and shortcomings of the gainsharing model. The sites we spoke with were generally positive regarding gainsharing. Similar to comments we heard during the first round of discussions, hospital leadership continued to view gainsharing as an opportunity to get physicians "on board" and engaged in hospital-driven cost and quality goals. Hospital leadership frequently told us that gainsharing brought physicians "to

the table" and enabled greater willingness to discuss and consider costs and efficiency of care. The sites that extended their participation in the demonstration all reported successfully generating internal cost savings that resulted in net positive savings to the hospitals once physician gainsharing payments were distributed. This was an expected finding since sites that did not meet their internal expected savings goals were unlikely to extend participation in the demonstration.

There was some variation in the degree to which individual hospitals thought physicians had changed their practice patterns and behavior by accepting and actively internalizing cost savings strategies and approaches. Three of the sites we spoke with during the round 2 visits described very specific changes in physician behavior, ranging from greater participation in committees and workgroups that identified savings opportunities. These three sites were optimistic that the mindset of physicians had changed over the course of the demonstration, and that lasting change was attributable (at least in part) to gainsharing. The other three sites felt some improvement in physician attention to costs was achieved, but they were less specific on how this was accomplished. In these sites, physician engagement in the ongoing generation of internal savings was not as pronounced.

Reduction in the length of inpatient stays was the most commonly cited specific goal set by participating hospital leadership, and was almost universally the highest priority. Other specific cost reduction goals included: more efficient use of operating rooms and reductions in turnaround time, cost effective use of critical care and telemetry units, improved quality and timeliness of medical records and related documentation, and streamlined selection of medical devices.

Physician Participation: Most physicians we spoke with in the second round focus groups considered participation in gainsharing a relatively easy decision. In our second round of discussions, there were very few physicians who expressed any specific concerns or reservations about gainsharing. By this point in the demonstration, there didn't seem to be lingering perceptions among physicians that gainsharing would be viewed negatively by patients. In fact, none of the physicians we spoke with reported any awareness of gainsharing on the part of patients (which had been an early concern for some physicians). Hospital leaders reported that very few physicians dropped out of gainsharing, and when they did, it was usually because they had very low volumes of admissions. Leadership in sites that are making the transition to the BPCI Model 1 Bundled Payment program anticipate that they will have no difficulty in recruiting new participants; this was attributed to generally positive feedback from physicians who participated in the PHC Demonstration.

Physicians generally continued to report that they already practiced high quality, patient focused and efficient medicine in the hospital setting and that gainsharing changed little except that "we get a check." Physicians expressing this perspective tended to downplay the impact of gainsharing on their own practices, at least when asked directly about changes. Similar to our findings from the first round, physicians tended to report that their practice behavior didn't change substantially. We continued to hear "I didn't change" from many participating physicians. However, some of these same physicians then went on to describe changes—some subtle, some substantial—they had in fact made to their hospital-based practice patterns as a

result of gainsharing. It was rare for physicians we spoke with to describe specific changes they had made to the way they practice in connection to gainsharing.

Assessment of Demonstration Impacts: The definition of success for each site in the PHC Demonstration varied somewhat across the hospitals. In the second round of focus groups, we continued to hear from hospital leadership that the financial incentive offered through the program "brought physicians to the table" in a way that had not been possible in the absence of the project. In this majority view, the gainsharing financial incentives made physicians more willing to meet with leadership, more willing to talk about costs and opportunities for internal savings, and more willing to review their individual performance data. For a few hospitals, this big-picture definition of success was more focused on creating a foundation for a collaborative culture rather than a specific focus on the amount of savings generated in the short run. The representatives of hospital leadership and the physician participants we spoke with commonly referred to a changing health care environment, the need to become more efficient, and a consciousness of costs; this was something new we did not hear during the first round a year ago. Because of this, participants on our discussions were more likely than a year ago to assert that 'something has to change' and gainsharing might be one way to accomplish that change towards lowering costs. One site told us: "Medicine is a team sport now."

All of the 6 hospitals we spoke with in this second round reported that the PHC Demonstration resulted in net overall savings to the hospital, though that is to be expected as it was unlikely that hospitals not achieving new savings would have agreed voluntarily to continue in an extension period. Hospital leaders we spoke with were generally satisfied with the levels of savings achieved and most reported that savings goals were met. Some leaders were unsure whether levels of savings achieved during gainsharing could be sustained in the long run, (particularly when the base year is redefined for sites participating in the Model 1 project).

Hospital Driven Changes: In all of the second round PHC sites, hospital leadership made organizational or other changes that often contributed to reduced lengths of stay or other sources of internal savings. As in the first round, typical hospital driven changes included improved and/or expanded admission and discharge planning, improving flow in Emergency Departments, and expanded availability of testing and other resources that allowed for patient care to move forward outside normal 9 to 5, Monday through Friday business hours. In the 6 sites we spoke with, 4 continued to institute programs, often with physician collaboration, to improve the purchasing of medical supplies and devices. A typical ongoing strategy was the consolidation of purchasing and improved price control for a more focused range of medical devices and supplies. We heard in this round that there was a shift away from an emphasis on reduced length of stay and an increasing focus on better management of services provided during the hospital stay. We also noted an emphasis among all 6 hospitals in the group on reducing the frequency of services not related to the inpatient stay. Hospital leadership seemed much more focused during this round of providing shifting as many services as clinically appropriate to an outpatient setting, thereby reducing the phenomenon of the "general tune up" for patients admitted for an acute episode but receiving a cadre of unrelated tests and services while in the inpatient setting for a separate but acute clinical event . One site in particular reported that they were actively explaining to patients that while it might be 'more convenient' to provide extended diagnostic testing and services "while they were in the hospital anyway", the new health care environment and a focus on reducing costs meant this was no longer possible. These hospital changes and

investments continued to be cited by most physicians as positive and an example of the improved collaboration between physicians and hospital leadership. We did hear from physicians in one site, however, that discharge planners and case managers had become increasingly 'aggressive' and that this had led to a level of discomfort with some physicians.

All hospital in the second round of site visits also made investments in expanded clinical outcome and resource use support systems, such as Crimson, that allowed physicians to monitor their performance on a more real-time, detailed clinical level compared to the basic metrics and reporting associated with the PHC demonstration (one site implemented Crimson prior to the start of the demonstration and 5 implemented Crimson or similar systems after the demonstration began). These 6 hospitals were all using output from the more detailed and timely Crimson systems to "drill down" physician performance metrics. The goal was to make the process of measuring physician performance more intuitive and detailed than was feasible in the AMS performance reporting dashboards. Hospital leadership also used these additional systems to address a common concern we heard during the first round on the timeliness of the physician feedback provided through the AMS process used to actually calculate official physician incentive amounts. While hospital leadership reported that having an outside contractor (in this case, AMS) calculate the incentive amounts was a critical resource in terms of administrative burden and conflict of interest (one site specifically told us that physicians would not have 'believed' incentive payments calculated internally by the hospital), the data lag and therefore timeliness of the AMS reports were really too long to be fully useful for physician monitoring. It appeared to us that, by the end of the PHC demonstration, most successful sites were operating a two-track system using AMS to calculate incentives and Crimson to monitor physician behavior and performance. That said, none of the physicians we spoke with reported that they regularly used Crimson on their own, outside of regular meetings with hospital leadership. One physician told us "I can't ever even remember my password." Others reported that they simply didn't have the time to spend reviewing their performance on Crimson.

Physician Incentive Trigger Metrics: All of the sites we visited in the second round continued to apply specific "trigger" metrics that had to be met by participating physicians in order for them to receive the full value of their incentive payments. Trigger metrics included performance standards on a range of core quality of care measures. Minimum performance on these metrics was necessary for physicians to receive full incentive payments. Use of additional process-oriented or other non-clinical metrics varied more widely by hospital site. A widespread non-clinical required metric was timely completion of medical record compliance, timely response to billing/coding queries, and timely response to other telephone inquiries and discharge requests from nursing staff. All of the hospitals we visited during this round of discussions required that physicians meet performance rather than improvement standards on these trigger metrics. Hospital leadership reported that once physicians experienced the loss of all or a substantial portion of their incentive payment as a result of non-performance on the non-clinical triggers, performance substantially improved – usually by the next performance period. The physicians we spoke with during the focus groups were all aware of these trigger metrics. Most participating physicians seemed to accept these standards as reasonable and appropriate. However, physicians in 2 of the 6 sites viewed these trigger metrics as a form of "gotcha" that was unfair to physicians who were mostly performing well. Physicians at one hospital site even took this sentiment further by believing that the hospital was constantly "moving the target" by modifying or adding new trigger metrics over time. Hospital leadership did acknowledge that

new trigger metrics had been added or existing ones became more stringent for compliance, but that the ones added or modified were all within the physician's control.

Process for Making Physician Gainsharing Payments: Based on our second round meetings with the leadership and the physician focus groups, the process for making physician gainsharing payments varied across hospitals. At all 6 hospitals we visited during this round, the physicians continued to receive a report (which was an Applied Medical Software (AMS)-generated document known among physicians as a "dashboard") along with their incentive check. However, these hospitals reported that the AMS report was primarily used only as a basis for the calculation of the incentives rather than as a basis for the review of physician performance. As we heard in the first round, many physicians and hospital leadership found the AMS data too lagged to form a successful discussion on physician performance. Instead, Crimson appeared to be the primary method for providing detailed physician performance at this point in the project.

The 6 PHC sites participating in the extended period distributed gainsharing incentives every six months. Four of the 6 require each physician to discuss their AMS and Crimson data as a condition of receiving their incentive payment. Leadership often reported that they focused on the potential incentives not paid as a method of incentivizing physicians to improve performance. One of the sites met only with physicians who have high volumes. Another met with some physicians but is generally not able to meet with all because of time limitations and the willingness of physicians to schedule appointments. Leadership who required a meeting in order for physicians to receive incentive checks reported that they believe this face to face discussion is very important to changing physician practice behaviors in the hospital.

As in the first round, the majority of physicians who participated in our focus groups did not understand the calculations that were used to determine their incentive payments. Hospital leadership in most cases confirmed that the physicians were probably unaware how the calculations were made and reported that they too had to make significant time investments to understand the calculations in order to explain them to the physicians.

Distribution of Physician Incentive Payment Amounts: Hospitals generally described the distribution of incentive payments as a bell curve with most physicians receiving between $2,000 and $4,000 every six month period. However, all hospitals also reported a minority of physicians who received either small (generally a few hundred dollars) or relatively large ($10,000 or more) in six month performance periods. One facility self-reported six month payments to individual physicians of about $29,000. The largest payments were made to either surgeons and/or physicians with high volumes of discharges.

Sources of Internal Savings Generated by Gainsharing: In the first round of site visits, most of the participating hospital models focused on a reduction in hospital inpatient lengths of stay and overall reductions in costs for inpatient stays. Feedback from the site visits suggested that reduced lengths of inpatient stays was by far the most common focus for internal savings since it was something each of the hospitals believed they had room to improve. A year later, during the second round discussions, we found that reducing length of stay was still important but was accompanied by a focus on additional strategies to generate internal savings.

Hospitals varied with regard to the degree of specificity in which they identified strategies to achieve internal savings. Two of the sites in the second round identified very general strategies to reduce costs, mostly focused on lower lengths of stay and a general reduction in inpatient services. Four of the 6 sites we visited were able to describe more specific strategies they were pursuing. Two of these had specific processes in place, both involving committees of physicians, to continuously identify opportunities for improvement – most but not all were focused on reducing costs. The specific strategies to achieve internal savings reported by hospital leadership during the second round of site visits were:

- Shifting services and tests not associated with the admission diagnoses to an appropriate outpatient setting
- Bulk purchasing of pharmaceuticals
- Improved cost-effectiveness of antibiotic, blood, routine laboratory testing and other services based on current best-practice literature
- Avoidance of duplicative services (for example, x-rays, CT Scans and MRIs on the same patient)
- Reduced utilization of general supplies though greater coordination, consolidation of ordering and reduction in waste
- Negotiated medical device pricing and streamline vendor options
- More timely discharge planning, beginning soon after admission

Experience in generating savings: Not surprisingly, the hospitals who agreed to participate in the extension period all perceived that gainsharing had some impact on the ability to generate internal savings. At this point in the project, none of the hospital leaders we spoke with were willing to attribute all of the successes of the past three years on gainsharing alone. They believed that successes were in part as a result of a focus on efficiency and quality of care improvements initiated prior to the project, some of which continued concurrent to the demonstration. However, leadership were clear that the gainsharing initiative brought physicians 'to the table' and, at least in their view, facilitated a more collaborative environment that supported cost and efficiency improvement efforts.

Four of the 6 hospitals we spoke with in the second round reported having internal cost accounting systems that allowed them to track savings. These varied somewhat, with some hospitals able to track the outcomes of very specific cost reduction initiatives using more extensive internal cost accounting systems. Two of the 6 did not have their own independent tracking of trends in costs and savings. Hospitals without their own internal account costing systems believed they had generated savings based on the reports that AMS estimated using a cost-to-charge ratio methodology, but were not able to be more specific about the costs that were reduced. Hospitals that had implemented more sophisticated technology looked deeper into their own reports to determine whether or not they actually generated net internal savings for the hospital. Hospitals with this capability varied regarding their assessment of net hospital savings generated; some clearly identified sources of net internal savings; others did not.

Net or Overall Hospital Savings: We found variation in hospitals' ability to report the amount of net or overall internal savings the hospital achieved (as opposed to the physician gainsharing incentive payments generated). One hospital reported that they saved about $9 million dollars. All hospitals participating in the expansion period firmly believed they had net positive internal savings once physician incentives were paid. However, most has some trepidation regarding the ability to continue to generate significant savings over time, believing that at some point the ability to continue to lower costs will become more difficult. All hospitals we spoke with were clear that quality of care and the interest of the patient were their first priority.

Expectations and Actual Changes in Physician Behavior: The extent to which incentive payments had an impact on physician behavior varied from hospital to hospital, and between hospital leadership and physicians. For the most part, hospital leadership we spoke with in the second round continued to perceive that the incentives played at least some role in changing physician behavior towards more efficient care. However, hospital leadership also acknowledged that in some cases real change in physician behavior and practice patterns can take time and are difficult to achieve. One site reported that it took at least 3 quarters to a full year to "retrain physicians."

During the physician focus groups, many physicians reported that they did not significantly change their practice behavior. Some insisted that they had always tried to get their patients out as soon as possible and the program did not affect their LOS and their overall practice patterns. However, when asked follow up questions, physicians during this second round of focus groups noted specific changes such as:

- Attempting to convey discharge orders earlier in the day so that patients can be discharged by 5pm.
- Having discussions with patients and families regarding target discharge much earlier during the inpatient stay.
- Scheduling tests and other services not related to the acute inpatient episode on an outpatient basis.
- Monitoring more closely what residents and consultants are ordering for their patients.
- Thinking twice about which physician consultants to rely on based on their response time. Consultants, who routinely took days to see inpatients, delaying discharge, were relied on less.
- Based on greater awareness of the costs of tests and other hospital supplies, physicians stopped requesting some routine tests and lab work because they weren't really necessary; they were just 'habit."
- Surgeons more careful to open supplies (gauze pads, sutures, etc.) only when necessary during operations.

- A few physicians stated the program gave them information and confidence to be more explicit in discussing costs with patients and families.

One factor that seemed to influence changes in physician behavior was whether or not the hospital employed their physicians. Four of the 6 sites we spoke with reported that they now employ at least some hospitalists who are generally more conscious of costs and attuned to supporting hospital efficiency initiatives.

Physician Understanding of Gainsharing Metrics: Our second round physician focus groups continued to report at best a basic understanding of how the gainsharing incentive payments were calculated. However, physicians had some common concerns with the overall methodology. A number reported that they were often held accountable for patient costs and outcomes that they couldn't fully control because other physician consultants played a role in clinical care. Others reported that physicians were being held to higher standards than nurses and other hospital staff. Physicians at two sites told us that while they were generally positive about gainsharing, they thought that the trigger metrics and other mechanisms that reduce or eliminate parts (or all) of incentive payments had "gone too far"; that physicians were being penalized for sometimes small mistakes while other hospital staff weren't similarly being held accountable. The feeling was increasingly that gainsharing incentives were sometimes withheld unfairly and that over time a "gotcha" mentality was creeping into the system. Some physicians believed that increased financial pressures on hospitals were driving leadership to try and minimize the incentives they were paying out to physicians. Because of this, in some sites, initial positive collaborations were now 'going in the wrong direction" in part because of what physicians perceived as increased pressure to identify and achieve internal savings.

Similar to our findings from the first round of discussions, few physicians said the dashboard was helpful and informative; a more common response was that the AMS dashboards were confusing and hard to follow. Physicians continued to note the lag in the data, which made it hard to remember the specific behaviors and decisions that led to the reported performance. Many physicians continued to express that they were evaluated on patients whose care they didn't necessarily control and so the data they received did not necessarily reflect their performance. This made them question the validity of the data they received. Physicians still reported the greatest understanding of the gainsharing metrics when they had individual meetings and sat down with someone in leadership to review the data. During these meetings, hospital leadership would walk the physician through his or her benchmark scores and show how the metrics corresponded to the payments. Even after participating in the demonstration for three years, some physicians continued to be suspect of the underlying data that supported the calculation of their performance. It was rare for a physician we met with to report that they clearly understood and internalized the performance metrics associated with gainsharing, resulting in a change in the way they practiced.

Demonstration Impact on Quality of Care: During this second round of discussions, hospital leadership was less likely to describe the demonstration as a quality initiative; the perception seemed to have shifted more towards an emphasis on cost reduction. None of the leaders in the hospitals we spoke with felt that gainsharing had any negative impact on patient quality of care. Readmission rates seemed to be a greater focus than in our previous visits. Two of the 6 hospitals we visited reported having some issues with rising readmission rates which

they believed they had improved and reversed; neither believed these problems were directly attributable to gainsharing. As in our discussions a year ago, we found that hospital leaders were not concerned about the post-acute care risk created by the 90 day post-acute care (PAC) episode window. Many reported that they are not monitoring PAC expenditures and believed that participation in the gainsharing program would not lead to PAC-related impacts.

None of the hospitals or individual physicians who participated in the focus groups believed that quality of care was negatively impacted by gainsharing. Leadership in one site reported: "Quality is still forefront."

Hospital leadership and physicians continued to believe that the patients had no awareness of the gainsharing program. We only heard about a reported drop in Press-Gainey scores in one site (and this was reported by physicians not hospital leadership). While both leadership and physicians were more likely to describe explicit discussions with patients and families regarding costs and limitations, none felt that the overall perception of patient satisfaction had declined significantly. One physician told us that he was very honest with patients: "We can't afford to do unrelated tests during the hospital admission anymore." Patients aren't always happy about limitations, we were told, but they appear to have an increased understanding about the costs of health care and the need to keep costs down.

4.4 Suggested Future Changes

During both rounds, hospital leadership and participating physicians we spoke with offered views on how the gainsharing model might be modified in future projects. One issue we heard consistently across both rounds of discussions related to the attribution of specific admissions to specific physicians. As reported to us by both leadership and participating physicians, the admitting physicians and the physician who treats the patient were sometimes different, though the admitting physician was the one that got the credit for better or worse. Though they acknowledged that this concept was beyond the scope of this demonstration, a number of individuals suggested a need to compensate those who are actually treating the patient, as well as holding everyone who makes resource decisions for the patient accountable to some degree.

Another common comment was the need to continue to identify new strategies to achieve internal cost savings and otherwise improve processes of care. During the first round most sites began the demonstration with an emphasis on improving efficiency related to length of stay. During the second round of discussions, the remaining 6 sites visited all seemed to be diversifying their strategies beyond reductions in lengths of stay. However, only 4 of the 6 reported with any specificity how these strategies might continue to be identified and operationalized. Some of the sites seem to consider the dissemination of performance metrics a strategy for savings in and of itself rather than a tool to support cost savings initiatives. Our discussions seemed to indicate that identifying and achieving internal cost savings opportunities became more challenging over time.

4.5 Summary Comments

The basic methodology for computing available incentive payment pools and the basic physician feedback reports was consistent across sites. Sites did customize additional data

sources, trigger metrics and strategies for achieving internal savings based on their individual circumstances and experience. Even with some differences among the ways sites implemented gainsharing, a number of common themes emerged from the two rounds of our site visits and physician focus groups:

- *Gainsharing is a promising model for some, but not all, hospitals.* Our first round site visits suggested that participating hospitals had few regrets in joining this gainsharing demonstration, but even at this earlier stage some sites were struggling to meet their self-defined goals for internal cost savings. Consistent with this view, not all participating sites elected to continue the demonstration during the extension period. The hospitals that elected to continue the demonstration during the voluntary extension period (July 2012 through April 2013) were those that perceived the project as successful and beneficial to their organization based on achieving net internal cost savings and improving hospital-physician collaboration. That only 8 of 12 elected to extend the gainsharing project past the official end date, and only a few were contemplating participation in the Model 1 Bundled Payment project[4] (which incorporates many elements of gainsharing but mandates savings to Medicare over time) underscores that this version of the gainsharing model was not universally successful for all sites.

- *Almost all sites believed that gainsharing improved the relationship and level of collaboration between hospitals and physicians.* Hospital leadership perceived that the incentive payments made physicians more receptive to hospital-driven internal cost savings initiatives. Physicians generally agreed with this perspective, but tended to have more reservations about the overall levels and success of physician-hospital collaboration. Some physicians perceived a slight worsening of this relationship as gainsharing matured and metrics moved from improvement to performance-based standards.

- Our first round of site visits found that many *physicians did not fully understand the gainsharing metrics or methodology*. It was common for physicians to report that they didn't really know what they had done (or not done) to receive an incentive check. But even as the PHC demonstration period closed, participating physicians in our second round of discussions still generally didn't understand the specifics of the cost and quality metrics that drive their incentive payments. We noted only modest and uneven improvement in the understanding physicians had of the specific gainsharing metrics and the changes expected of them between the first and second rounds of discussions. As a result, a direct link between the incentive payments and changes in physician behavior wasn't always clear to the participants.

- *Reducing length of stay didn't generate net internal hospital savings for all participating facilities.* Reduced length of stay was the most common internal cost saving strategy noted in our first round of discussions. By the second performance year, most hospitals diversified internal savings strategies to include: more efficient

4 None of the PHC Demonstration sites ultimately participated in the Model 1 Bundled Payment project.

use of blood products, pharmaceuticals, oxygen, laboratory testing and other services; shifting services unrelated to the acute episode to outpatient settings; and negotiated medical device pricing and streamlined vendor options. The second round of discussions found that shifting services not central to the inpatient admission (the "general tune up") to an outpatient setting when clinically appropriate has become as much of a cost-savings focus as reducing length of stay.

- *Ongoing success of gainsharing may depend on additional investments in more detailed and timely physician feedback*. This level of internal investment in timely data sources and more frequent one on one discussions with participating physicians was unevenly implemented when we conducted the first round of discussions. Some participating physicians we spoke with during the first round had virtually no contact with hospital leadership regarding expectations and their own relative performance under gainsharing. By the second performance year, most sites had supplemented AMS feedback dashboards with Crimson or other similar systems. Hospital leadership believed that having an independent organization (such as AMS) calculating the physician incentives was critical from an administrative burden and conflict of interest perspective. However, these data did not tend to be persuasive in changing physician behavior, mostly because of its high level nature and lagged time frame.

- *Sites varied in how they identified and monitored strategies for generating internal savings.* Some hospitals, even in the first round of discussions, were very specific about activities generating savings, which were more versus less successful, and what additional future changes should be considered. Physicians tended to be involved in successful processes where opportunity for improvement was consistently identified on an on-going basis. As a result, physicians from these sites were also more likely to know how internal savings were generated for their facility. Other sites took a more general approach to generating internal savings, relying on reductions in lengths of stay but without specific initiatives to achieve these reductions. These sites seemed to rely on individual physicians to move towards cost reductions and general efficiency based on the data and performance feedback provided through gainsharing; in a sense, using the performance data as a strategy rather than a tool.

SECTION 5
MEDICARE EXPENDITURE AND SAVINGS ANALYSIS

One element of the Physician Hospital Collaboration (PHC) demonstration evaluation was an analysis of changes in Medicare expenditures (and any associated savings) that may be attributable to the gainsharing intervention. One primary focus of the gainsharing model as implemented in the New Jersey Care Integration Consortium (NJCIC) sites was a reduction in inpatient length of stay (LOS) and associated costs. Although Medicare savings were not required under this demonstration, CMS is interested in determining whether any changes occurred in utilization and subsequent Medicare expenditures—and therefore may have produced net internal program savings. This section presents the analysis of Medicare expenditures and LOS for demonstration and comparison sites for the three implementation years.

5.1 Data Sources and Measures

Medicare inpatient claims were obtained for the 2007–2008 baseline calendar years for both the demonstration and comparison hospitals using CMS's Data Extraction System. Intervention year data for calendar years 2009 through 2012 were subsequently obtained. "Cross-referencing" (checking for alternative and/or updated beneficiary identifiers) was performed to obtain all health insurance claims assigned to each beneficiary. RTI then made the claims to available to Actuarial Research Corporation (ARC). Using the claims in conjunction with demographic and enrollment data in the Medicare Enrollment Database, ARC determined beneficiary eligibility requirements for beneficiaries represented in the potential inpatient data. ARC identified an *index* Inpatient Prospective Payment System (IPPS) hospitalization that was used as the basis for constructing each expenditure episode. Finally, an analytic file was created by ARC that included a set of "episode" claims for the demonstration and comparison hospitals for the 2008 calendar year baseline period and the three intervention years July 2009 – June 2012. Claims for all DRGs that are covered under the PHC demonstration were included in this analytic file. After creation of the beneficiary episode file, both RTI and ARC used this same analytic file to ensure data consistency among the various analyses for this demonstration.

Medicare Episode Expenditure Measures: Episodes included all Part A&B fee for service-related health care services within the 14-day pre-admission and the 90-day post-discharge windows were defined by the demonstration protocols. Beneficiary co-payments were excluded. No initial adjustments were made for local area differences in Medicare payment rates (e.g., different wage indices and indirect medical education add-ons). We relied on regression methods to control for factors affecting Medicare payment rates. Although the 2008 and subsequent IPPS inpatient claims were paid under the recently implemented Medicare Severity Diagnosis Related Group (MS-DRG) system, each of the inpatient claims was grouped using the older DRG system (grouper version 24).

For their analyses, ARC "censored" episode expenditures (Medicare payments) at the 95th and 5th percentiles using what they called a DRG weight, tier-normalized outlier truncation methodology.[5] RTI did not employ ARC's methodology of capping expenditures because we

[5] Briefly, they classified claims into five tiers on the basis of the DRG weight. Within each tier, expenditures below the 5th percentile were recoded to the 5th percentile's value and expenditures above the 95th percentile were recoded to the 95th percentile's value.

were interested in the composition of expenditures and did not want to bias the analysis against the study hospitals if they were constraining expenditures of the sickest beneficiaries.

In preliminary descriptive analyses, we grouped Medicare payments in the baseline and first intervention year by pre-admission, index hospital, and post-discharge period and by type of health service. Next, four types of episode payments (expenditure) variables were constructed:

1. Total episode payments—includes payments to all providers in the three periods, as specified in the *Budget Neutrality Analysis Reconciliation Payment* protocol.

2. Episode payments excluding Medicare's IPPS (inlier and outlier) payments to the index hospital.

3. Episode payments excluding only the fixed inlier DRG payment to the index hospital.

4. Episode payments for only the 14-day pre-admission and 90-post discharge periods.

Table 5-1 summarizes these four types of episode payment measures. The total episode payment definition is the most inclusive of the four measures and was the definition used by ARC in its analyses. The second episode measure excludes the two forms of DRG payment (inlier and outlier) made to the index hospital. The third measure isolates the outlier payment from the inlier payment. The fourth measure of episode payments includes Medicare payments for health services provided only during the pre-admission and post-discharge periods. The purpose of this measure was to determine whether efforts by Demonstration hospital to reduce costs might have led to increased payments for health services provided during the pre-admission and post-discharge periods. Although not examined in detail, lower inpatient costs might result in greater pre-admission testing and in discharging patients "quicker and sicker." For the most part, it was not possible for participating hospitals to reduce IPPS inlier payments because Medicare pays a flat DRG-based amount regardless of resources used by the hospital. Review of the analytic data files found episodes that had unusually low values of Medicare expenditures. Since these values appeared to be data errors, these episodes were dropped from RTI's expenditures analyses.[6]

Cost-Related Measures: Internal cost savings were estimated by a NJCIC contractor and were validated by ARC. To determine whether Medicare claims could also be used to detect cost reductions, we examined three cost-related measures: length of stay (LOS) of the index hospitalization, IPPS outlier payments for the index hospitalization, and payments for physician services provided during the index hospitalization. LOS was chosen, in part, because, historically, New Jersey hospitals have had among the longest lengths of stay in the country. LOS reductions were also a key internal cost saving strategy as identified by the participating

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[6] Episodes for which all total episode expenditures (payments) were zero or less were dropped. Episodes were also dropped if total institutional payments for the index hospitalization were zero or less. One reason these two types of payments could be zero or less is due to Medicare policies when a Medicare payment is less than the standard Part A deductible. Medicare recovers all or part of the deductible payment from the hospital. Another reason these two types of payments could be zero or less is due to Medicare hospital policies for beneficiaries who have used up their lifetime Medicare benefits. Beneficiaries are responsible for the hospital payments which, in turn, Medicare recovers from the hospitals.

hospitals. Reduced lengths of stay should result in lower nursing costs and, possibly, reduced diagnostic testing. Shorter stays can also reduce infections and other costly complications (e.g., pressure ulcers).

Table 5-1
Four expenditure measures

Payment component	(1) Total episode payment	(2) Episode payment excluding index IPPS hospital payment	(3) Episode payment excluding only inlier DRG payment	(4) Episode payment for pre-admission & post-discharge periods
14 day pre-admission	X	X	X	X
Index hospital inlier DRG	X	—	—	—
Index hospital outlier	X	—	X	—
Index hospital physician	X	X	X	—
90-day post-discharge	X	X	X	X

NOTES: Panel 1: total episode payments—includes payments to all providers; Panel 2: episode payments excluding Medicare's inlier and outlier payments to the index hospital; Panel 3: episode payments excluding only the fixed inlier DRG payment to the index hospital; and Panel 4: episode payments for only the 14-day pre-admission and 30-day post discharge periods. The panel numbers conform to the four episode payment measures shown in Table 5-1.

IPPS outlier payments are based on excess hospital costs—costs of which might be influenced by physician behavior. IPPS outlier payments for the index hospitalization were examined on a per index hospitalization basis and decomposed into two parts: incidence of outlier status and IPPS outlier payments for only those index hospitalizations with an outlier payment.

In the event participating hospitals achieved internal cost savings, the PHC Demonstration shared the savings with participating physicians. These rewards were based on the premise that changes in physician behavior are responsible, in part, for these internal cost savings. If this premise is correct, then it might be possible to detect changes in physician behavior by examining whether there were changes in physician payments for services rendered during the index hospitalization.

5.2 Methods

Multivariate analysis was conducted on the four Medicare expenditure measures, the beneficiary's index hospital length of stay, the beneficiary's outlier payments, and inpatient physician payments. IPPS outlier payments were examined using two approaches: (1) IPPS outlier payments per index discharge; and (2) a "two-part" first-stage logistic model on the likelihood of incurrence of IPPS outlier payments in the index hospitalization followed by a second stage OLS regression on IPPS outlier payments conditional on exceeding the outlier threshold.

In testing for PHC Demonstration effects on Medicare expenditures, LOS, and outliers, as well as on quality of care and patient safety in Section 6, the following difference-of-differences (2D) approach was used:

$$Y_{i,t} = \alpha + \beta \cdot X_{i,t} + \gamma_1 \cdot D_{i,t} + \gamma_2 \cdot T + \gamma_3 \cdot T \cdot D_{i,t} + \varepsilon_{i,t} \quad (5\text{-}1)$$

where:

Y	is a dependent variable (e.g., Medicare episode payment)
D	is a binary variable where 1 denotes an episode starting at a demonstration hospital and 0 denotes an episode starting at a comparison hospital
T	is a binary variable where 0 denotes an episode in the base period and 1 denotes an episode in the demonstration period
$T \cdot D$	is an interaction term between D and T used to estimate the 2D effect
X	is a vector of beneficiary and hospital characteristics
ε	error term
i, t	subscripts used to denote an i episode during time period t

The PHC demonstration effect on changes in payments and other outcomes is measured by the interaction term, $\hat{\gamma}_3$. For per episode Medicare payments, positive values of $\hat{\gamma}_3$ indicate per episode payments rising faster at participating hospitals than at comparison hospitals. Conversely, negative values of $\hat{\gamma}_3$ indicate per episode payments rising slower at participating hospitals. Negative estimates of $\hat{\gamma}_3$ indicate that the PHC Demonstration was able to slow the growth in Medicare payments per episode. The $\hat{\gamma}_1$ coefficient represents the mean difference between participating and comparison hospitals in the base period after controlling for beneficiary and hospital differences. The $\hat{\gamma}_2$ coefficient estimates the growth in the dependent variables (e.g., episode payments) for comparison hospitals between the base and the demonstration period.

Although the comparison hospitals were matched on several characteristics and therefore should play little role in explaining differential rates of episode growth between study and comparison hospitals, we did control for many of the same characteristics in the multivariate model. This has the effect of factoring out variation due to these variables and improving the precision of the models' estimates. The individual βs for the beneficiary and hospital characteristics are interpreted as the marginal effect of a unit change in a specific characteristic on payments or other outcome variables. Because the impact model (Equation 5-1) is estimated in linear form, coefficients for hospital characteristics (e.g., DRG weight and wage index) are unrealistically high. This is because Medicare discharge payments are based on a multiplicative formula. As an example, for the inlier payment, a one unit increase in DRG weight results in a greater percentage increase if DRG casemix is correlated with, say, interns and residents per bed or wage index.

To determine whether there were year-specific demonstration effects, regressions were also estimated using an alternative specification: T, where a value of one represented the entire demonstration period, is replaced by a set of year-specific demonstration period indicators identifying PY 1, PY 2, and PY 3. (The base period is part of the constant term, α.) Similarly, the T·D 2D estimator is replaced by a set of year-specific 2D estimators: PY1·D, PY2·D, and PY3·D. The coefficients for the year-specific 2D estimators show the difference-in-differences between the base year and the specific performance year for the PHC Demonstration.

Table 5-2 displays the mean values for all explanatory variables in the base year and PY 3 (see Appendix Table 5-1 for all four years of data). While age, gender, and race may indirectly capture the impact of patient health and access to care, the HCC risk score (prospectively measured) is the most comprehensive, payment-weighted, measure of health status prior to the index hospitalization. Table 5-2 shows only slight differences between the comparison and demonstration hospitals with regard to age, gender, race and HCC risk score in both the baseline and PY 3.

Table 5-2
Means of Explanatory Variables, by time period and demonstration status

Name	Base year comparison	Base year demo	Performance year 3 comparison	Performance year 3 demo
Patient age 0 to 64	0.109	0.098	0.123	0.111
Patient age 65 to 69	0.121	0.127	0.132	0.136
Patient age 70 to 74	0.144	0.145	0.141	0.146
Patient age 75 to 79	0.177	0.184	0.157	0.161
Patient age 80 plus	0.449	0.445	0.447	0.447
Female	0.590	0.579	0.590	0.573
Non-white	0.141	0.126	0.153	0.133
DRG weight	1.413	1.510	1.476	1.552
HCC risk score	3.353	3.239	3.446	3.438
IPPS area wage index	1.255	1.218	1.220	1.183
Intern/resident to bed ratio	0.129	0.094	0.133	0.100
Hospital beds	364	338	357	367
DSH adjustment factor (operating)	0.046	0.045	0.038	0.033
Average LOS for DRG	5.190	5.163	4.843	4.930
Number of observations	55,983	51,353	48,666	46,295

NOTES:
DRG = diagnosis-related group; DSH = disproportionate share hospital; HCC = hierarchical condition category; IPPS = inpatient prospective payment system; LOS = length of stay.

SOURCE: RTI processing of Medicare claims.

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The beneficiary's DRG weight is included as a regressor because it directly influences the IPPS payment amount. It also is likely to influence health care services used in the post-discharge period (e.g., rehabilitation after orthopedic surgery). In the baseline year, comparison hospitals had an average DRG weight of 1.413 which increased to 1.510 in the third performance year. The demonstration hospitals, by comparison, had an average DRG weight of 1.510 in the baseline year which increased slightly to 1.552 in the third performance year.

Four hospital-specific measures, for the index hospitalization, are included among the explanatory variables: (1) the IPPS area wage index, (2) intern/resident to bed (IRB) ratio, (3) the IPPS disproportionate share (DSH) adjustment factor, and (4) the number of hospital beds. The first three of these directly affect IPPS payment amounts and are included to factor out variations in hospital payments directly due to the payment mechanism that are outside the control of participating hospitals. They are also included because they might explain variation in payments for index admission outlier and physician services as well as services rendered during the pre-admission and post-admission periods. Hospital beds are included because they might proxy the effect of hospital size and complexity on the intensity of care during and after the index hospitalization. Table 5-2 shows no substantive differences between the comparison and demonstration hospitals for these variables with the exception of the IRB ratio and the DSH adjustment factor. In both the baseline and third performance years, the demonstration hospitals had a lower IRB ratio that increased slightly between the two time periods. The IRB ratio for the comparison hospitals increased slightly from 0.129 to 0.133 during the same time period. During the baseline the DSH adjustment factors for the demonstration and comparison hospitals were nearly identical. Both DSH adjustment factors fell between the baseline and PY 3, but more so for the PHC demonstration hospitals.

For the LOS regression, the national mean LOS for the index DRG is also included as an explanatory variable because substantial reductions in LOS might not be feasible, especially for DRGs with inherently low lengths of stay. We observed only slight differences in this explanatory variable between the comparison and demonstration hospitals, with both groups showing reductions in LOS estimates between the baseline and PY 3.

The regressions in both this section and in Section 6 (Quality of Care) were estimated with an adjustment for clustering. Clustering, if present, means individual observations from a given hospital are not independent from each other. Specifically, each observation within a hospital provides less information about treatment in the hospital than if the observations were independent. In essence, each observation is worth less than one "full" independent observation.

Clustering can occur if Medicare payments for beneficiaries in one hospital are more alike than Medicare payments for beneficiaries in another hospital. This can occur for several reasons. First, for discharges from a given hospital, the standardized amounts, the IPPS area wage index, the indirect medical adjustment (IME), and the disproportionate share adjustment (DSH) are all the same. Second, extended lengths of stay during the index hospitalization probably systematically differ by hospital because it is likely each hospital has its own discharge protocols. Extended lengths of stay can lead to higher costs and, possibly, outlier payments. Third, discharge destinations and treatment in the post-discharge period also probably differ by hospital. For instance, some hospitals might systematically discharge more beneficiaries to home health while other hospitals might discharge more beneficiaries to home. For types of

patients commonly discharged to skilled nursing facilities, rehabilitation hospitals, and long-term care hospitals, the index hospital might have a preferred set of providers to which the patients are sent. And differing styles of care by hospitals during index hospitalizations might lead to systematically different readmission rates and use of other medical services.

Adjusting for clustering does not affect the estimated regression coefficients. It does, however, usually increase the estimated standard errors. And when standard errors increase, it results in higher p-values and can result in loss of statistical significance for individual explanatory variables.

5.3 Descriptive Results

Average total episode payments in participating hospitals were $24,822 during the base year, about $115 higher than observed for comparison hospitals (***Table 5-3***). Average total episode payments increased $2,988 for the participating hospitals by the third performance year while rising $2,475 for the comparison hospitals during the same period. Medicare hospital payments for the index hospitalization averaged $9,371 dollars in the base year for participating hospitals, just over one-third of average episode payments, and were $9,663 dollars in the third performance year. Inpatient physician payments added roughly another six percent to episode payments, resulting in about 40 to 45 percent of episode payments accounted for during the index admission. Medicare payments for health services during the pre-admission period accounted for about one and a half percent of episode payments while post-discharge period payments accounted for about 54 to 58 percent of episode payments. Follow-on hospital admissions (e.g., readmissions, long-term care, and rehabilitation admissions) accounted for fully 21 to 23 percent of average episode payments in the base period and SNF payments another 16 to 19 percent. The changes in the shares of the three major payment categories were usually less than a percentage point. (See Appendix Tables 5-2 through 5-4 for all four years of analysis.)

Mean episode payments for each of the four expenditure measures are shown in ***Table 5-4*** (see ***Appendix Tables 5-5*** and ***5-6*** for all four years of data)***.*** Average total episode payments for demonstration and comparison group hospitals were nearly identical (less than 1 percent) in the baseline, but differed by about two percent in performance year 3. Average total episode payments for the comparison group hospitals increased by $2,475 between the baseline and PY 3, compared to a higher increase of $2,988 for demonstration hospitals, a difference of $513. Payment growth rates varied somewhat under the alternative episode definitions. Excluding the IPPS inlier and outlier payments for index hospitalizations, the comparison hospital payments increased by $1,953 between baseline and PY 3 compared with a larger increase ($2,697) among demonstration hospitals, resulting in a difference in growth rates of $744. Using the third episode definition that excludes only the inlier payment, average total payments grew $780 more in demonstration hospitals. Finally, considering average payments for only the pre- and post-discharge windows, average payments increased to comparison hospitals by $1,856 and $2,562 for demonstration hospitals, a $707 difference. Average episode payments, all four measures, at the PHC hospitals (as a group) steadily increased between the base year and PY 3 (***Figure 5-1***). They also steadily increased at the comparison hospitals through PY 2, but actually declined between PY 2 and PY 3. Total episode payments were also graphed for each of the 12 PHC hospitals (***Figure 5-2***). Two of the PHC hospitals (Holy Name Hospital and Monmouth Medical Center) also experienced a decline in total episode payments between PY 2 and PY 3.

Table 5-3
Components of Medicare Payments, by time period and demonstration status

Period	Mean Payments				Percent of Total Episode Payments			
	Base Year		Performance Year 3		Base Year		Performance Year 3	
(Payment component)	Comparison	Demo	Comparison	Demo	Comparison	Demo	Comparison	Demo
14-day pre-admission period	235	249	269	286	0.95	1.00	0.99	1.03
Physician								
Outpatient	78	89	110	122	0.32	0.36	0.40	0.44
Durable medical equipment	15	15	17	18	0.06	0.06	0.06	0.07
Total	328	354	396	426	1.33	1.43	1.46	1.53
Index hospitalization period	8,823	9,213	9,319	9,443	35.71	37.12	34.29	33.95
IPPS hospital inlier								
IPPS hospital outlier	178	159	203	220	0.72	0.64	0.75	0.79
IPPS hospital total	9,001	9,371	9,523	9,663	36.43	37.75	35.04	34.75
Physician	1,486	1,567	1,582	1,701	6.01	6.31	5.82	6.12
Total	10,486	10,938	11,105	11,364	42.45	44.07	40.86	40.86
Post-discharge period	5,782	5,487	6,016	5,939	23.40	22.11	22.13	21.36
Inpatient								
Skilled nursing facility	4,040	3,894	4,864	5,151	16.35	15.69	17.90	18.52
Durable medical equipment	174	173	154	153	0.71	0.70	0.57	0.55
Outpatient	595	524	874	859	2.41	2.11	3.22	3.09
Physician	2,319	2,357	2,648	2,749	9.39	9.49	9.74	9.88
Home health agency	981	1,095	1,123	1,170	3.97	4.41	4.13	4.21
Total	13,890	13,530	15,679	16,020	56.22	54.51	57.69	57.61
Total episode	24,705	24,822	27,180	27,810	n/a	n/a	n/a	n/a
Number of Observations	55,983	51,353	48,666	46,295	n/a	n/a	n/a	n/a

NOTE:
IPPS = inpatient prospective payment system
SOURCE: RTI processing of Medicare claims.
run_req045_stats_v3, part 12 (4-21-2014)

Table 5-4
Mean Episode Payments, Length of Stay, and IPPS Outliers by time period and demonstration status

Name	Base year		Performance year 2		Change between BY and performance year 3 comparison	Change between BY and performance year 3 demo	Difference in differences
	Comparison	Demo	Comparison	Demo			
Total episode Medicare payments*	$24,705	$24,822	$27,180	$27,810	$2,475	$2,988	$513
Total episode payments other than the payment to the index hospital*	$15,704	$15,450	$17,657	$18,147	$1,953	$2,697	$744
Total episode payments other than the flat inlier DRG payment to the index hospital. This includes any outlier payments made to the index hospital.*	$15,882	$15,609	$17,860	$18,367	$1,978	$2,758	$780
Total episode payments for the 14-day pre-admission period plus the 90-post discharge period (same as second type except physician payments during the index hospitalization are excluded)*	$14,219	$13,883	$16,075	$16,446	$1,856	$2,562	$707
Length of Stay (days)	6.21	6.32	5.87	6.04	-0.33	-0.28	0.05
IPPS outlier (index hospitalization [discharge])	$178	$159	$203	$220	$26	$62	$36
Outlier payments over all index discharges							
Percent of index discharges with outlier payments	1.23%	1.36%	1.48%	1.66%	0.25%	0.30%	0.05%
Outlier payments per index discharges with an outlier	$14,460	$11,631	$13,786	$13,247	-$674	$1,615	$2,289
Number of observations	55,983	51,353	48,666	46,295	n/a	n/a	n/a

NOTE:

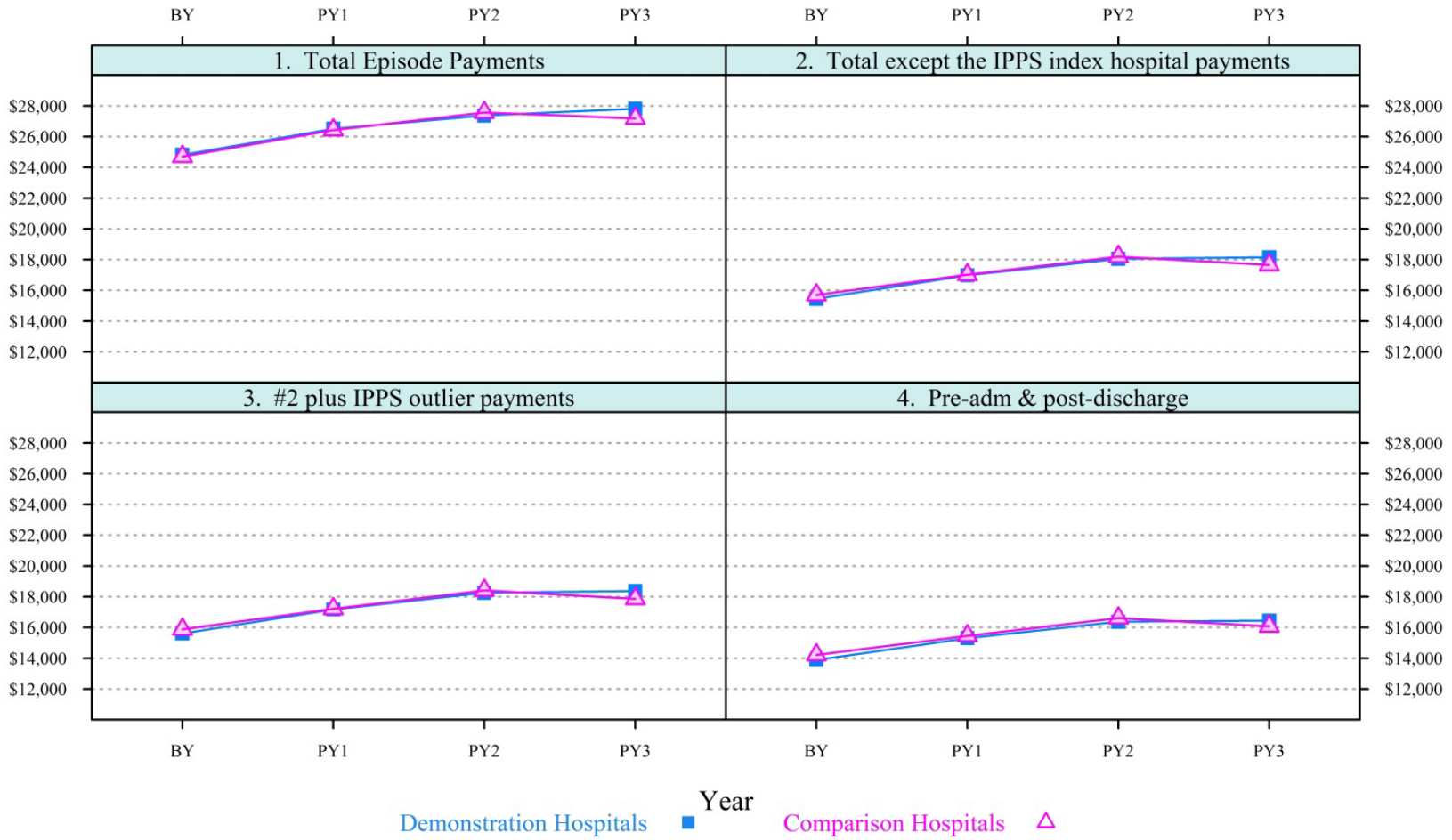
*Excludes beneficiary co-payments. BY = base year;

DRG = diagnosis-related group; IPPS = inpatient prospective payment system.

SOURCE: RTI processing of Medicare claims.

run_req045_stats_v3, parts 10 and 13b (4-21-2014)

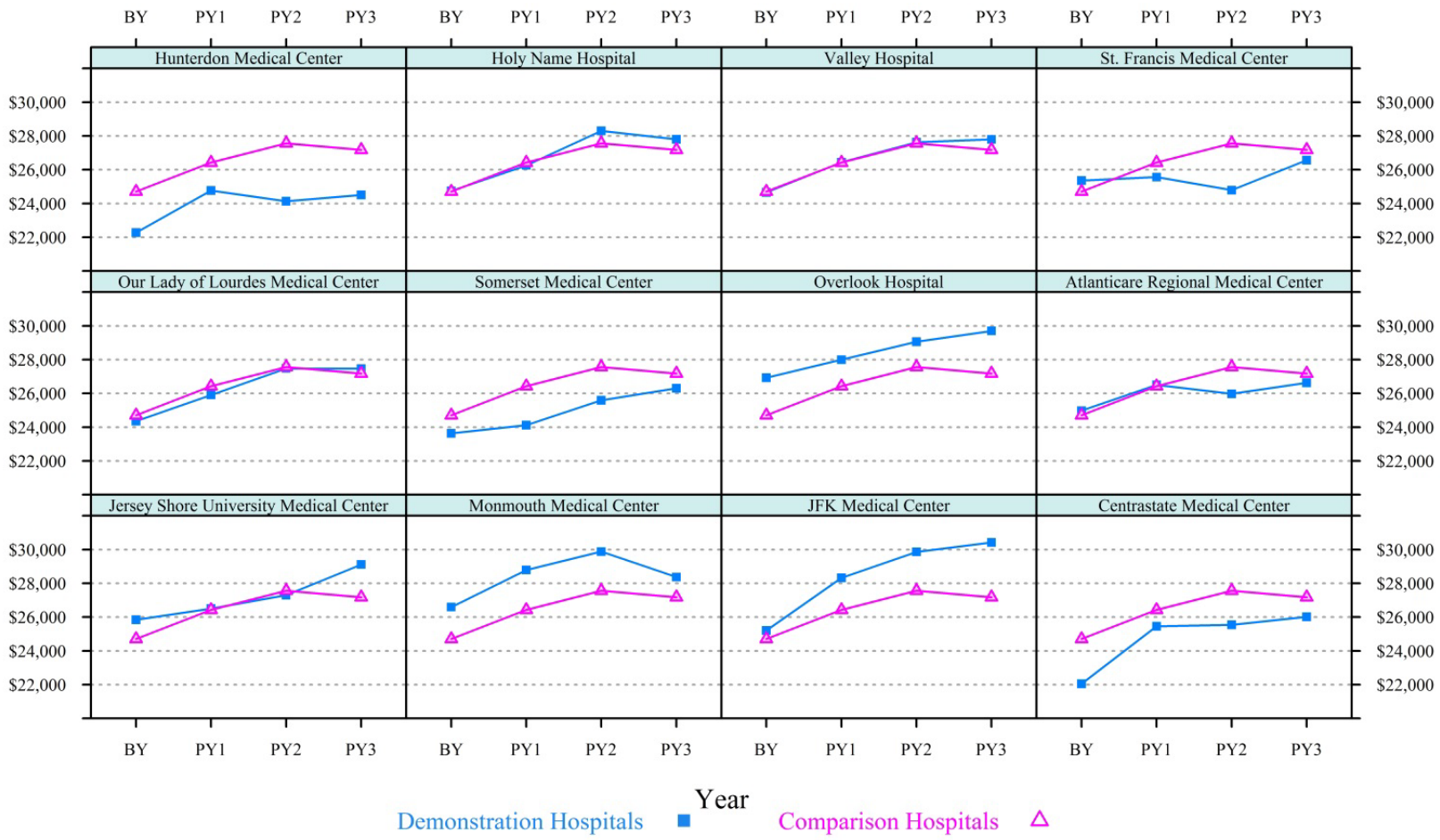
Figure 5-1
Average total episode payments for four types of payment measures by performance year and demonstration status



NOTES: Panel 1: total episode payments—includes payments to all providers; Panel 2: episode payments excluding Medicare's inlier and outlier payments to the index hospital; Panel 3: episode payments excluding only the fixed inlier DRG payment to the index hospital; and Panel 4: episode payments for only the 14-day pre-admission and 30-day post discharge periods. The panel numbers conform to the four episode payment measures shown in Table 5-1.

SOURCE: RTI processing of Medicare claims.

Figure 5-2
Average total episode payments (payment measure #1) for each PHC Demonstration participating hospital by performance period



SOURCE: RTI processing of Medicare claims.

Another way of viewing changes in average episode payments over time is the upper left panel of ***Figure 5-3***. The line plotted in this panel shows the unadjusted 2D (difference in differences) between the base year and each performance year and is calculated as follows:

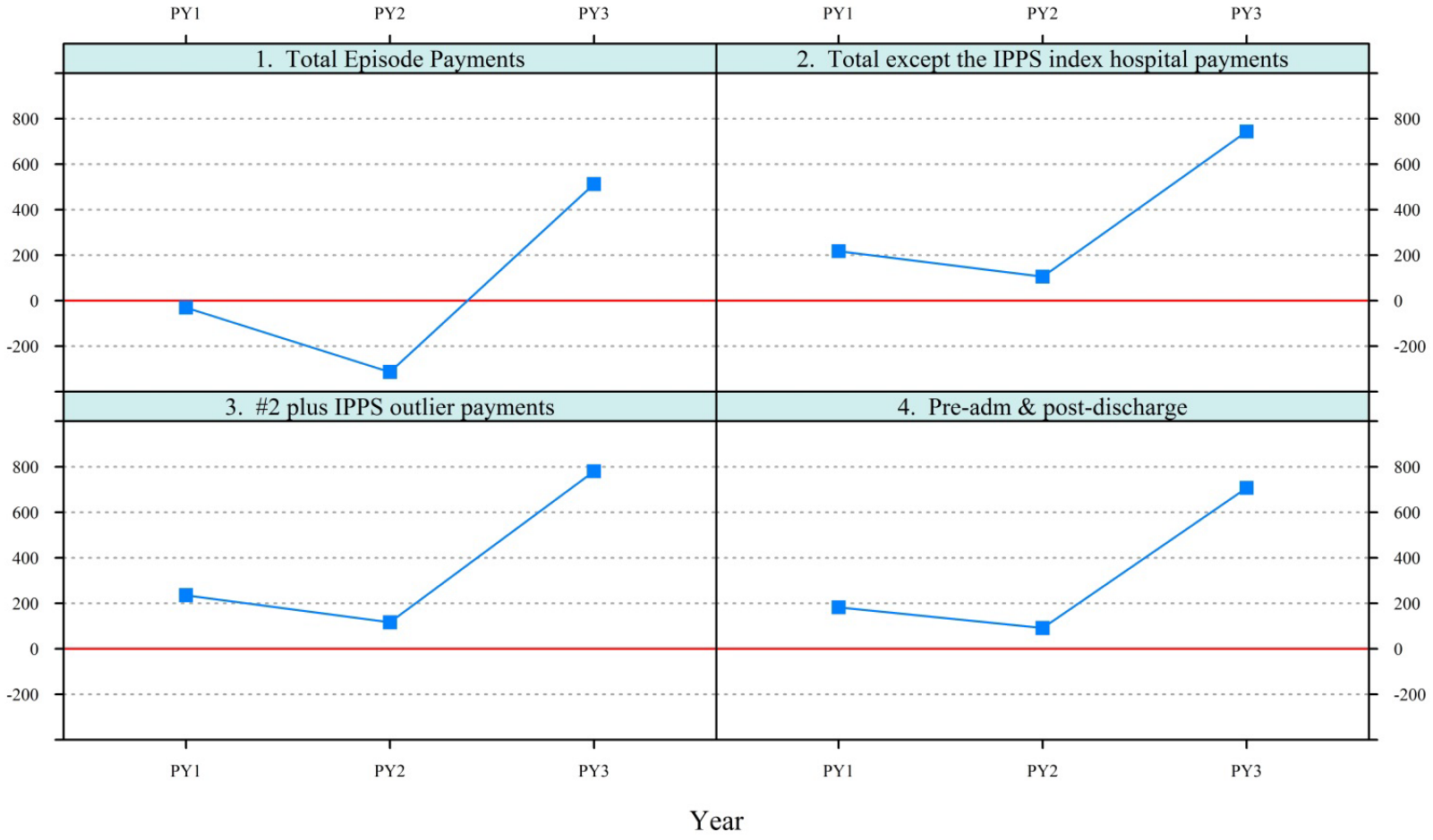
= (average PHC PY payments minus average PHC base year payments) –
(average comparison PY payments minus average comparison base year payments).

A positive value for the 2D estimate indicates the amount PHC payments increased more than at its comparison hospitals whereas a negative 2D value indicates the amount PHC payments increased less than at its comparison hospitals. The upper left panel of Figure 5-3 shows that largest unadjusted 2D savings estimate was -$313 for PY 2 and that it became positive in PY 3 at about $513. This suggests that the largest impact, in terms of total Medicare savings occurred during the second performance year. Readers should be reminded that the PHC demonstration sites were not required to achieve Medicare savings; however, spillover impacts resulting in Medicare savings were a possibility which this analysis was intended to detect.

While payment increases varied somewhat under the alternative episode definitions, the U-shape was present for all four measures of spending. That is, Medicare payments increased for the PHC hospitals between PY 1 and PY 2, but declined through PY 3. Excluding the IPPS inlier and outlier payments for index hospitalizations, comparison hospital payments increased by $1,953 from baseline through performance period 3 and by $2,697 for PHC, resulting in a difference in growth rates of $744 in increased payments for the PHC sites. As with total episode payments, the observed decrease in PHC for this second payment measure occurred in PY 2 (upper right panel in Figure 5-3). Using the third episode definition that excludes only the inlier payment, average total payments grew by an additional $780 in the PHC hospitals relative to comparison sites (lower left panel of Figure 5-3). Finally, considering average payments for only the pre- and post-discharge windows, average payments increased for the comparison hospitals by $1,856 and for PHC hospitals by $2,562, a $707 increase relative to the comparison sites (lower right panel in Figure 5-3). Difference-in-differences graphs are not presented for individual PHC hospitals because the comparison hospitals were selected to match the PHC hospitals as a group instead of for each PHC hospital by itself.

Average total growth in payments per episode were $513 more in PHC hospitals, or about two percent of the average episode payment in the comparison hospitals during the third demonstration year. This can be attributed to higher growth in demonstration hospitals' post-discharge inpatient payments ($217) and SNF payments ($432). (As with the values in Table 5-3, the values in Table 5-4 are not adjusted for casemix.) It can be seen in Appendix Table 5-2 that SNF payments fell for both the comparison and PHC hospitals between PY 2 and PY 3, but more so for the comparison hospitals. In contrast, post-discharge inpatient payments fell between PY 2 and 3 for the comparison hospitals but increased for the PHC hospitals. These changes in post-discharge payments cannot be readily explained by relative changes in demographic characteristics or relative changes in health (as measured by the DRG weights and risk scores). Nor can they be explained by changes in mortality rates or readmission rates (see Section 6).

Figure 5-3
Unadjusted difference in differences for four types of payment measures by performance year



NOTE: See notes to Figure 5-1. Difference in differences for each performance year was based on the differences between the performance and the base year.

SOURCE: RTI processing of Medicare claims.

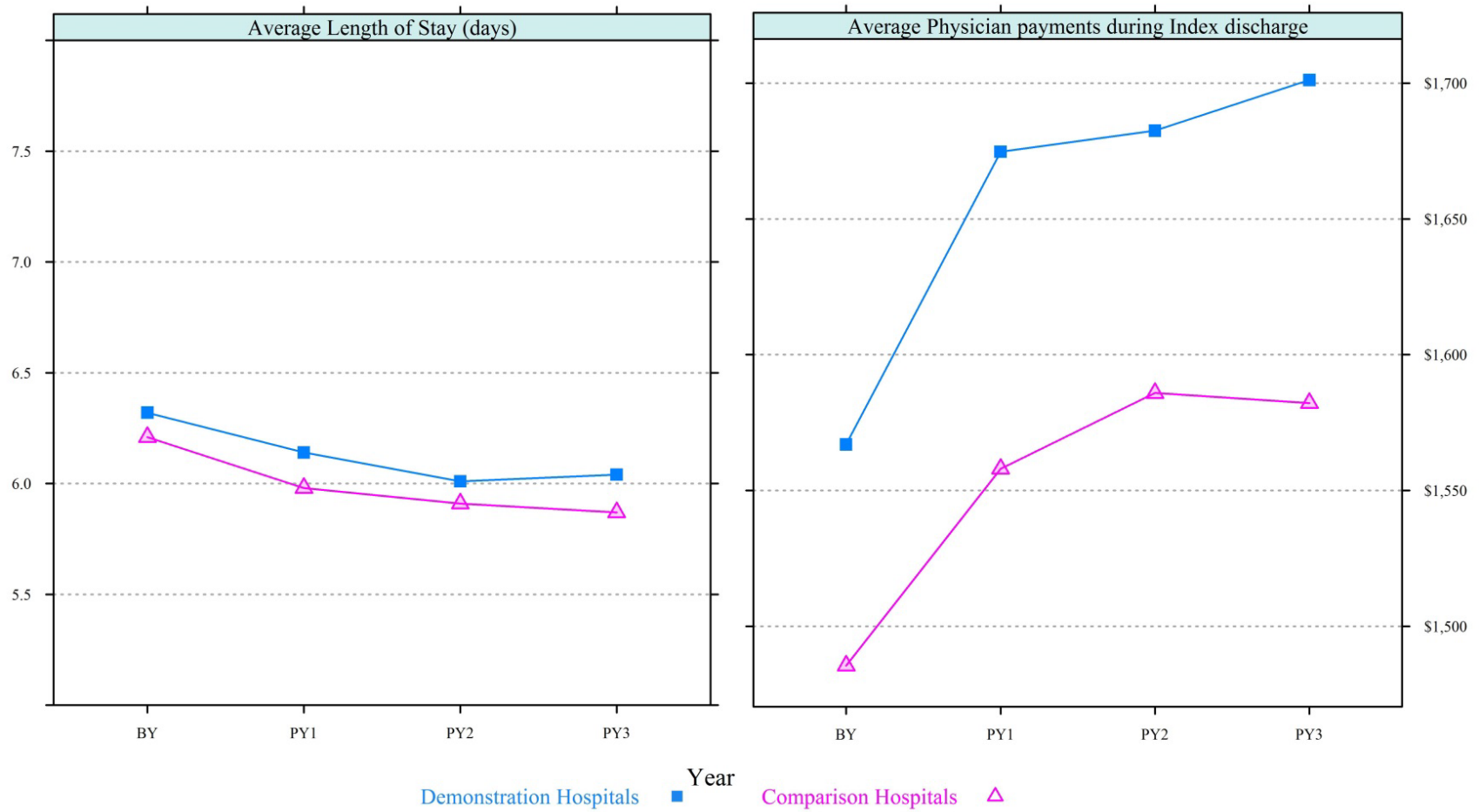
Inpatient physician spending in demonstration hospitals rose $38 more and outlier payments, $36 more. As can be seen in the right-hand panel in ***Figure 5-4***, inpatient physician payments steadily increased for the PHC hospitals but fell off for comparison hospitals between PY 2 and PY 3. Comparison hospitals shortened their average length of stay by 0.33 days compared to 0.28 days for the demonstration hospitals. Comparison hospitals actually experienced steady declines in average length of stay whereas, for PHC hospitals as a group, the decline ended in PY 2 (left-hand panel of Figure 5-4). Only four PHC hospitals had declines between PY 2 and PY 3 larger than those for the comparison hospitals (***Figure 5-5***). Both groups' average lengths of stay, were greater than 6 days or just below in the baseline and first two performance years, exceeded the national Medicare average length of stay (5.6 days in 2008, 5.5 days in 2009, 5.4 in 2010 and 2011, and 5.3 in 2012).[7]

While the overall increase in demonstration hospital outlier payments were just $36 greater than in comparison hospitals, the year-to-year changes differed with an especially large contrast between PY2 and PY 3 (right-hand panel of ***Figure 5-6***). This was partly due to a large disparity in the change in outlier payments for beneficiaries incurring an outlier. Outlier payments per outlier beneficiary decreased an average of $674 per discharge for comparison hospitals between the baseline and third performance year, but increased by $1,615 for demonstration hospitals. This relative increase was compounded by a faster increase in the percentage of admissions with an outlier payment: 0.25 percentage increase in comparison hospitals versus 0.30 percentage increase in demonstration hospitals (left-hand panel of Figure 5-6).

While descriptive statistics are informative, both study and comparison hospitals lost admissions which may impact the relative cost performance of the two groups. Therefore, our analytic approach relies on a multivariate difference in difference analysis that is described and presented in the next section.

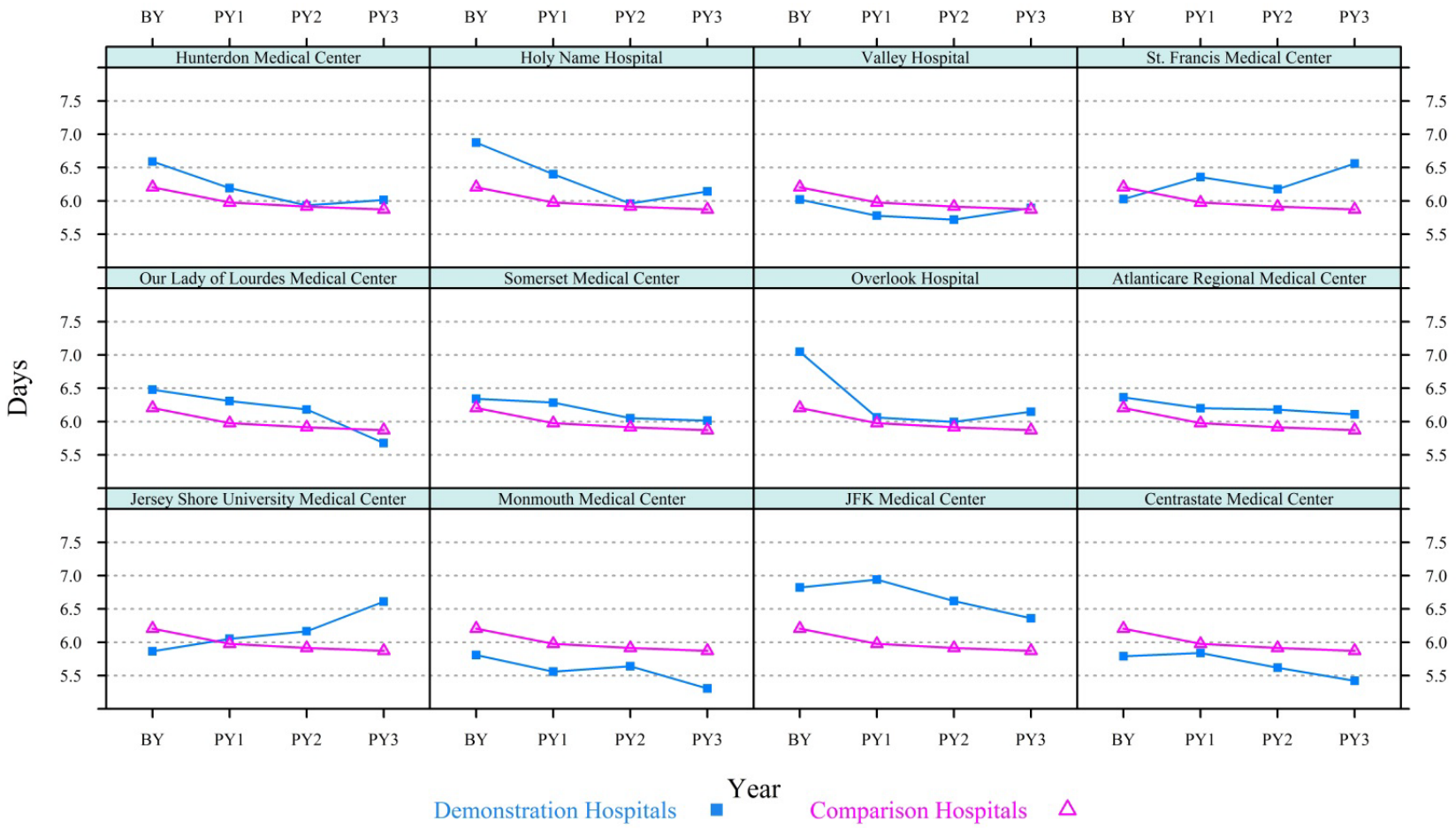
[7] http://cms.hhs.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/MedicareMedicaidStatSupp/2013.html (Table 5-1). accessed on April 28, 2014.

Figure 5-4
Average length of stay and average inpatient physician payments during index hospital stay by performance year and demonstration status



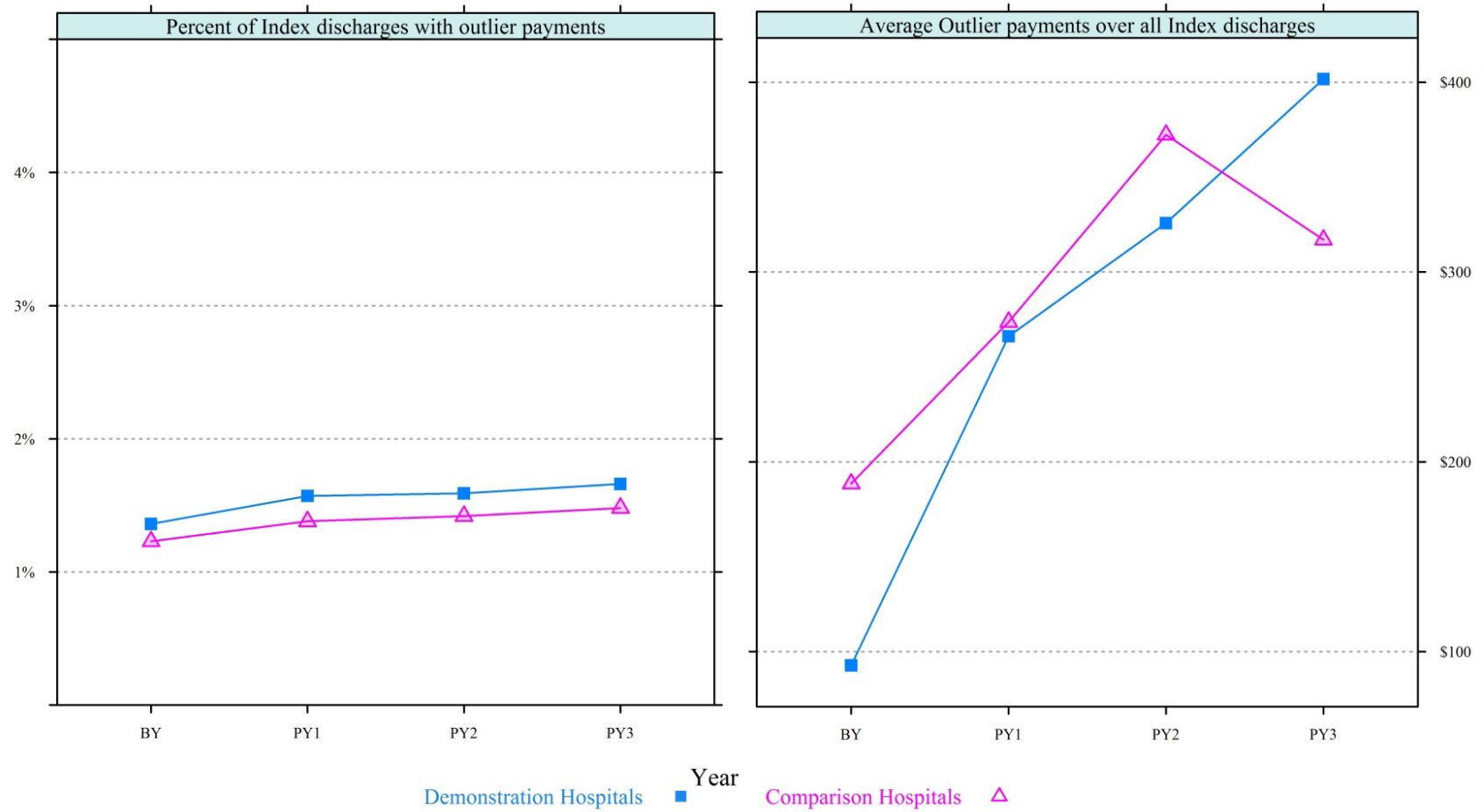
SOURCE: RTI processing of Medicare claims.

Figure 5-5
Average length of stay for each PHC Demonstration participating hospital by performance period



SOURCE: RTI processing of Medicare claims.

Figure 5-6
Share of index discharges with outlier payments and average outlier payments over all index discharges by performance year and demonstration status



SOURCE: RTI processing of Medicare claims.

5.4 Multivariate Results

Episode Payments*: *Table 5-5 presents estimates for the full model (Equation 5-1) for the four payment measures. The 2D coefficients were $471 to $577 higher for episodes originating at PHC participating hospitals than at comparison hospitals, but none of these coefficients were statistically significant, even at the 10% level. This indicates the PHC Demonstration did not have a statistically significant effect on per episode Medicare payments in the demonstration. The participating hospital indicator was always highly insignificant after controlling for imbalances represented by the other beneficiary and hospital characteristics. The performance period indictor indicates that total episode payments for comparison hospitals increased by nearly $2,478. Controlling for other variables, pre/post-discharge payments (measure 4) increased $2,113 on average. While the pre/post-discharge payments increased $471 more in participating hospitals, the estimate is not different from zero at standard statistical levels.

Year-specific 2D estimates (***Table 5-6***) all had positive values, indicating that episode payments for the PHC participants increased more than the comparison hospitals during each performance year. And the magnitudes increased each year. However, only the PY 3 2D estimates were statistically significant at the 10 percent level or better. The PY 3 2D estimates ranged from $824 for average total episode payments (measure 1) to $950 for average episode payments excluding only IPPS inlier payments (measure 3). The participating hospital indicator was positive for all episode payment measures except #3 and none were statistically significant. The performance period indicators shows that episode payments for comparison hospitals increased from annually up through PY 2 for all four episode payment measures and were all statistically significant at conventional levels. The PY 3 coefficients were also positive but smaller in magnitude than the PY 2 coefficients.

Together with Figure 5-3's 2D estimates, the year-specific 2D results indicate the impact of the demonstration on Medicare payments was inconsistent across years. The 2D PY 3 effect on total episode payments suggests there were problems with post-acute care payments for the PHC participants were not shared by the comparison hospitals.

As the coefficients for the other variables are similar in both tables, the results from Table 5-5 are presented here. The two variables most directly associated with payments and the health condition of beneficiaries—DRG weight and the patient's prospective HCC risk score—both have positive, statistically significant effects. The coefficient for the DRG weight is over $10,000 in the total episode payment regression, but falls to $4,153 and less in the other three episode payment regressions. The DRG weight coefficient is artificially higher in the total payments regression that includes the DRG inlier payment because payments are determined in a compound, non-linear fashion while the wage index, resident-to-bed ratio, and DSH ratio were estimated in linear form. In the other three models, DRG weight clearly plays a cost-increasing role by raising outlier and physician payments as well as adding significantly ($2,968) to pre/post-discharge payments, even after controlling for other beneficiary characteristics. The coefficient on the HCC risk score has a narrow range from $227 to $231.

Table 5-5
Episode payment regressions

Explanatory variable	1. Total episode payments			2. Total except the IPPS index			3. #2 plus IPPS outlier payments			4. Pre-adm & post-discharge		
	Coef.	Std. Err.	P > | t |	Coef.	Std. Err.	P > | t |	Coef.	Std. Err.	P > | t |	Coef.	Std. Err.	P > | t |
Patient age 0 to 64	931.1	247.9	0.001	847.3	231.9	0.001	954.0	243.5	0.001	928.6	222.7	0
Patient age 70 to 74	779.2	117.1	0	790.6	112.9	0	767.2	115.5	0	782.4	110.0	0
Patient age 75 to 79	2011.0	185.2	0	1963.7	181.8	0	1973.0	185.8	0	1946.2	181.5	0
Patient age 80 plus	3573.4	209.2	0	3575.8	200.3	0	3576.8	211.8	0	3608.3	202.2	0
Female	32.5	183.4	0.861	109.9	187.3	0.562	92.1	191.7	0.635	103.4	181.6	0.574
Non-white	106.1	174.9	0.549	21.0	178.0	0.907	78.8	178.7	0.663	41.7	170.7	0.809
DRG weight	10677.4	195.5	0	3777.5	161.9	0	4153.0	176.7	0	2967.8	156.9	0
HCC risk score	229.0	15.2	0	230.9	14.3	0	231.3	14.8	0	226.9	14.2	0
IPPS area wage index	18798.1	3085.7	0	13643.2	2894.5	0	13159.3	2934.2	0	13263.0	2769.7	0
Intern/resident to bed ratio	9616.5	2151.7	0	5049.4	1997.0	0.018	4792.7	2012.2	0.025	4883.3	1942.3	0.018
Hospital beds	-2.8	2.1	0.206	-3.1	1.9	0.111	-3.1	2.0	0.125	-2.7	1.9	0.173
DSH adjustment factor (operating)	9563.3	4897.3	0.062	3122.8	4403.9	0.485	3339.7	4526.3	0.467	2898.7	4154.5	0.492
Participating hospital indicator	90.6	507.1	0.860	18.0	463.7	0.969	-62.5	459.4	0.893	8.1	434.6	0.985
Demonstration Period indicator	2478.3	293.9	0	2178.6	256.6	0	2172.1	275.5	0	2113.2	244.5	0
2D estimator	482.1	375.0	0.210	541.0	340.4	0.124	577.2	347.4	0.109	471.3	325.1	0.159
Constant term	-17627.3	3618.2	0	-9408.2	3364.4	0.010	-9138.7	3416.2	0.013	-9415.3	3237.8	0.007
R^2	0.3182	—	—	0.0695	—	—	0.0773	—	—	0.0505	—	—
Number of observations	404,981	—	—	404,981	—	—	404,981	—	—	404,981	—	—

NOTES: DRG = diagnosis-related group; HCC=hierarchical condition category; IPPS = inpatient prospective payment system.

SOURCE: RTI processing of Medicare claims.

gain2_request2_apr22_2014

Table 5-6
Episode payment regressions, year-specific 2D effects

Explanatory variable	1. Total episode payments			2. Total except the IPPS index			3. #2 plus IPPS outlier payments			4. Pre-adm & post-discharge		
	Coef.	Std. Err.	P > | t |	Coef.	Std. Err.	P > | t |	Coef.	Std. Err.	P > | t |	Coef.	Std. Err.	P > | t |
Patient age 0 to 64	929.0	248.5	0.001	844.9	232.6	0.001	951.7	244.2	0.001	926.2	223.5	0
Patient age 70 to 74	786.2	116.5	0	798.1	112.3	0	774.7	115.0	0	789.8	109.5	0
Patient age 75 to 79	2019.1	185.1	0	1972.4	182.0	0	1981.8	185.9	0	1954.9	181.8	0
Patient age 80 plus	3573.3	209.5	0	3575.6	200.7	0	3576.6	212.1	0	3608.2	202.6	0
Female	34.8	183.0	0.851	112.3	186.7	0.553	94.6	191.2	0.625	105.8	181.1	0.564
Non-white	103.1	175.4	0.562	17.7	178.4	0.922	75.5	179.2	0.677	38.4	171.1	0.824
DRG weight	10676.4	195.4	0	3776.4	162.0	0	4152.0	176.7	0	2966.8	156.9	0
HCC risk score	229.1	15.2	0	231.0	14.3	0	231.4	14.8	0	227.0	14.2	0
IPPS area wage index	18858.6	3120.8	0	13708.4	2925.7	0	13224.4	2965.9	0	13329.4	2802.3	0
Intern/resident to bed ratio	9612.9	2136.1	0	5045.2	1984.3	0.017	4788.6	1998.6	0.024	4879.6	1929.3	0.018
Hospital beds	-2.8	2.2	0.210	-3.1	1.9	0.114	-3.2	2.0	0.128	-2.7	1.9	0.175
DSH adjustment factor (operating)	9632.3	4862.7	0.058	3196.7	4368.7	0.471	3411.6	4486.6	0.454	2977.1	4125.0	0.477
Participating hospital indicator	92.4	507.5	0.857	20.0	464.0	0.966	-60.5	459.6	0.896	10.1	435.0	0.982
Performance Year 1 Indicator	1954.8	263.0	0	1615.5	223.4	0	1604.0	244.0	0	1557.8	214.6	0
Performance Year 2 Indicator	3000.3	319.4	0	2744.8	296.8	0	2750.6	315.2	0	2665.4	289.3	0
Performance Year 3 Indicator	2496.0	351.1	0	2192.5	300.9	0	2178.5	317.6	0	2133.9	279.5	0
Performance Year 1 2D estimator	330.9	327.8	0.322	363.3	302.1	0.240	396.0	315.0	0.220	293.0	296.2	0.332
Performance Year 2 2D estimator	318.7	415.0	0.449	384.7	396.9	0.341	415.1	399.2	0.308	316.9	384.8	0.418
Performance Year 3 2D estimator	824.0	469.8	0.091	904.4	403.9	0.034	950.5	412.6	0.029	833.4	374.3	0.035
Constant term	-17703.4	3644.1	0	-9490.1	3388.9	0.010	-9220.5	3439.9	0.013	-9498.5	3263.5	0.007
R^2	0.3184	—	—	0.0699	—	—	0.0778	—	—	0.0509	—	—
Number of observations	404,981	—	—	404,981	—	—	404,981	—	—	404,981	—	—

NOTES: DRG = diagnosis-related group; HCC=hierarchical condition category; IPPS = inpatient prospective payment system.
SOURCE: RTI processing of Medicare claims.
gain2_request2_apr28_2014

Even controlling for age, gender, race, DRG, and HCC score, beneficiary age still shows a strong positive effect on all four payment measures. The coefficients for the gender and race are not statistically significant. As expected, the IPPS area wage index and IRB ratio are major contributors to total episode payments because of their role in determining inlier hospital payments. It appears that the wage index also is acting as a proxy for prices and utilization in the post-discharge care settings, as evidenced by its $13,263 coefficient in model 4. Greater teaching intensity also adds considerably, not only to the DRG inlier payment, but also to extra physician and outlier payments. This effect carries over to the ambulatory setting, even controlling for the beneficiary's DRG and HCC score, but it is not evident why this occurs.

Length of Stay*:** The 2D coefficient for LOS was positive but not statistically significant (Table 5-7***). Two of the year-specific 2D coefficients for LOS were positive while that for PY 3 was negative; none of the three coefficients were statistically significant (***Table 5-8***). Although the coefficient for the DRG weight in the LOS regression is negative instead of positive, this is probably because of the strong positive effect of the national average LOS in the model. The coefficient for the HCC risk score is positive and statistically significant. The patient age variables have the same signs and patterns of coefficients as in the episode payment regressions. Female and non-white patients have longer LOS than males and whites. The IPPS DSH adjustment factor was positive and highly significant. Beneficiaries treated in hospitals with lower income patients possibly are more difficult to place after discharge.

***IPPS Outlier Payments*:** Two variants of hospital outlier payments were analyzed (Table 5-7). The estimated 2D effect for total outlier payments per beneficiary episode was $21.97 but was not statistically significant (p = .695). Further, the adjusted R^2 of 0.038 is extremely low. The year-specific 2D coefficients were all positive with the lowest value in PY 2—none were statistically significant (Table 5-8). Next, we decomposed outlier payments into two parts: (1) the likelihood of an outlier; and (2) outlier payments conditional on being an outlier. The 2D estimate of the likelihood of incurring an outlier payment was negative (-0.0134) but not statistically significant (Table 5-7). The year-specific 2D estimates declined over time and were even negative by PY 2 but none of the coefficients were statistically significant (Table 5-8). A $2,036 effect was found on outlier payments for beneficiaries actually incurring an outlier payment, but it was not statistically significant (Table 5-7). The year-specific 2D estimates were all positive and increased annually but, again, none of the coefficients were statistically significant (Table 5-8).

Inpatient Physician Payments: The 2D coefficient in the inpatient physician payments regression (***Table 5-9***) was $69.72 and was marginally statistically significant (p = 0.090) with an adjusted R^2 of 0.4453. This indicates Medicare Part B physician payments increased $69.72 more at participating hospitals than at the comparison hospitals. The year-specific 2D estimates range from $67.84 to $71.01. Of the three year-specific estimates, only the PY 3 2D estimate of $70.25 was statistically significant. Physician payments for the youngest (mostly persons with disabilities) and the very oldest Medicare beneficiaries were lower than for other beneficiary age categories. Physician payments were lower for non-white beneficiaries. The DRG weight and HCC prospective risk score both had positive coefficients.

Table 5-7
Length of stay and IPPS outlier payment regressions

Explanatory variable	Length of stay			IPPS outlier payment amount			Decomposition of IPPS outlier payments*					
							Logit results for the likelihood of an IPPS outlier hospitalization			OLS results on IPPS outlier payments for discharges with an outlier payment		
	Coef.	Std. Err.	P > | t |	Coef.	Std. Err.	P > | t |	Coef.	Std. Err.	P > | t |	Coef.	Std. Err.	P > | t |
Patient age 0 to 64	0.262	0.043	0.000	59.2	29.5	0.055	0.010	0.079	0.903	1562.1	1174.6	0.195
Patient age 70 to 74	0.089	0.024	0.001	-31.7	17.9	0.088	-0.076	0.050	0.128	-442.2	675.5	0.519
Patient age 75 to 79	0.253	0.026	0.000	-10.3	17.7	0.566	-0.012	0.042	0.776	195.0	794.1	0.808
Patient age 80 plus	0.413	0.034	0.000	-56.3	18.9	0.006	-0.221	0.056	0.000	-930.7	836.1	0.276
Female	0.090	0.017	0.000	-19.1	9.9	0.064	-0.221	0.033	0.000	-221.9	606.4	0.717
Non-white	0.305	0.049	0.000	43.2	18.9	0.031	0.035	0.055	0.525	475.8	810.3	0.562
DRG weight	-0.146	0.038	0.001	151.2	33.7	0.000	-0.379	0.069	0.000	-38.7	328.6	0.907
HCC risk score	0.016	0.003	0.000	-3.2	0.7	0.000	0.000	0.002	0.907	-53.4	22.1	0.023
IPPS area wage index	0.429	0.596	0.478	-510.8	269.7	0.069	-2.992	1.404	0.033	2975.3	5362.0	0.584
Intern/resident to bed ratio	-0.905	0.481	0.071	-272.5	225.3	0.237	-1.520	1.104	0.168	215.9	6476.1	0.974
Hospital beds	0.000	0.000	0.130	0.1	0.2	0.536	0.001	0.001	0.173	2.7	4.9	0.583
DSH adjustment factor (operating)	2.782	0.857	0.003	305.6	537.1	0.574	0.714	1.929	0.711	-999.8	12100.4	0.935
Average LOS for DRG	0.986	0.017	0.000	118.4	18.6	0.000	0.335	0.032	0.000	873.0	148.5	0.000
Participating hospital indicator	0.138	0.119	0.256	-55.2	48.1	0.261	0.013	0.252	0.960	-2851.7	1456.0	0.061
Demonstration period indicator	-0.040	0.066	0.548	29.8	35.0	0.402	0.262	0.149	0.078	501.3	1227.1	0.686
2D estimator	0.016	0.129	0.903	22.0	55.3	0.695	-0.013	0.258	0.959	2035.9	1484.5	0.182
Constant term	0.504	0.719	0.490	12.6	369.0	0.973	-2.254	1.762	0.201	1096.2	6558.9	0.869
R^2 (pseudo for logit)	0.3433	—	—	0.0378	—	—	0.1133	—	—	0.109	—	—
Number of observations	404,981	—	—	404,981	—	—	404,981	—	—	5,885	—	—

NOTES: DRG = diagnosis-related group; HCC=hierarchical condition category; IPPS = inpatient prospective payment system.

SOURCE: RTI processing of Medicare claims.

gain2_request2_apr22_2014

Table 5-8
Length of stay and IPPS outlier payment regressions, year-specific 2D effects

	Length of stay			IPPS outlier payment amount			Decomposition of IPPS outlier payments*					
							Logit results for the likelihood of an IPPS outlier hospitalization			OLS results on IPPS outlier payments for discharges with an outlier payment		
Explanatory variable	Coef.	Std. Err.	P > | t |	Coef.	Std. Err.	P > | t |	Coef.	Std. Err.	P > | t |	Coef.	Std. Err.	P > | t |
Patient age 0 to 64	0.261	0.043	0.000	59.0	29.5	0.056	0.009	0.079	0.912	1566.2	1184.0	0.197
Patient age 70 to 74	0.089	0.024	0.001	-31.4	17.9	0.090	-0.074	0.050	0.138	-457.8	680.7	0.507
Patient age 75 to 79	0.255	0.026	0.000	-9.9	17.6	0.578	-0.009	0.042	0.829	209.3	800.3	0.796
Patient age 80 plus	0.413	0.034	0.000	-56.4	18.9	0.006	-0.220	0.056	0.000	-924.8	835.1	0.278
Female	0.090	0.017	0.000	-19.0	9.9	0.065	-0.220	0.033	0.000	-195.4	604.3	0.749
Non-white	0.304	0.049	0.000	42.9	18.9	0.032	0.034	0.055	0.540	507.7	803.8	0.533
DRG weight	-0.150	0.037	0.000	150.2	33.7	0.000	-0.391	0.070	0.000	-58.3	327.8	0.860
HCC risk score	0.016	0.003	0.000	-3.2	0.7	0.000	0.000	0.002	0.854	-55.4	21.8	0.018
IPPS area wage index	0.438	0.592	0.466	-508.1	270.1	0.071	-2.948	1.391	0.034	3566.4	5369.9	0.512
Intern/resident to bed ratio	-0.908	0.482	0.071	-273.0	225.1	0.236	-1.518	1.097	0.167	364.9	6460.5	0.955
Hospital beds	0.000	0.000	0.128	0.1	0.2	0.537	0.001	0.001	0.180	2.7	5.0	0.593
DSH adjustment factor (operating)	2.807	0.872	0.003	311.0	537.0	0.568	0.782	1.948	0.688	-891.6	12199.6	0.942
Average LOS for DRG	0.988	0.017	0.000	118.9	18.5	0.000	0.341	0.033	0.000	883.4	147.3	0.000
Participating hospital indicator	0.138	0.119	0.254	-55.1	48.1	0.262	0.015	0.252	0.952	-2818.0	1455.5	0.064
Performance Year 1 Indicator	-0.124	0.053	0.027	5.1	29.3	0.864	0.138	0.151	0.361	-136.4	1070.3	0.900
Performance Year 2 Indicator	-0.041	0.069	0.558	43.5	44.7	0.340	0.279	0.160	0.081	1232.2	1467.6	0.409
Performance Year 3 Indicator	0.053	0.096	0.589	42.7	35.7	0.243	0.404	0.154	0.009	513.4	1427.3	0.722
Performance Year 1 2D estimator	0.066	0.113	0.562	25.1	46.2	0.592	0.029	0.216	0.892	1949.7	1251.9	0.131
Performance Year 2 2D estimator	0.010	0.132	0.942	16.4	89.0	0.856	-0.009	0.416	0.982	1962.0	1942.4	0.322
Performance Year 3 2D estimator	-0.032	0.165	0.848	24.6	45.8	0.595	-0.064	0.200	0.747	2234.6	1574.0	0.168
Constant term	0.488	0.714	0.501	7.9	368.6	0.983	-2.329	1.742	0.181	273.5	6530.6	0.967
R^2	0.3434	—	—	0.0378	—	—	0.1138	—	—	0.1097	—	—
Number of observations	404,981	—	—	404,981	—	—	404,981	—	—	5,885	—	—

NOTES: DRG = diagnosis-related group; HCC=hierarchical condition category; IPPS = inpatient prospective payment system.

SOURCE: RTI processing of Medicare claims.

gain2_request2_apr28_2014

Table 5-9
Physician inpatient payments regression

Explanatory variable	Coefficient	Standard error	P > | t |
Patient age 0 to 64	-81.3	14.9	0.000
Patient age 70 to 74	8.2	9.5	0.392
Patient age 75 to 79	17.5	10.2	0.099
Patient age 80 plus	-32.5	14.0	0.029
Female	6.5	8.3	0.443
Non-white	-20.7	14.2	0.155
DRG weight	809.6	21.8	0.000
HCC risk score	4.0	0.4	0.000
IPPS area wage index	380.2	229.8	0.110
Intern/resident to bed ratio	166.1	146.7	0.268
Hospital beds	-0.5	0.1	0.001
DSH adjustment factor (operating)	224.1	352.8	0.531
Participating hospital indicator	10.0	41.3	0.811
Demonstration period indicator	65.4	26.2	0.019
2D estimator	69.7	39.6	0.090
Constant term	7.1	269.3	0.979
R^2	0.4453	—	—
Number of observations	404,981	—	—

NOTES:
DRG = diagnosis-related group; HCC=hierarchical condition category; IPPS = inpatient prospective payment system.

SOURCE: RTI processing of Medicare claims.

gain2_request2_apr22_2014

Table 5-10
Physician inpatient payments regression, year-specific 2D effects

Explanatory variable	Coefficient	Standard error	P > | t |
Patient age 0 to 64	-81.3	14.9	0.000
Patient age 70 to 74	8.3	9.4	0.386
Patient age 75 to 79	17.5	10.2	0.097
Patient age 80 plus	-32.6	14.0	0.028
Female	6.5	8.3	0.443
Non-white	-20.7	14.2	0.155
DRG weight	809.7	21.8	0.000
HCC risk score	4.0	0.4	0.000
IPPS area wage index	379.0	229.4	0.111
Intern/resident to bed ratio	165.7	146.7	0.269
Hospital beds	-0.5	0.1	0.001
DSH adjustment factor (operating)	219.5	353.0	0.539
Participating hospital indicator	9.9	41.3	0.812
Performance Year 1 Indicator	57.7	23.0	0.019
Performance Year 2 Indicator	79.4	26.4	0.006
Performance Year 3 Indicator	58.7	34.2	0.099
Performance Year 1 2D estimator	70.3	31.8	0.036
Performance Year 2 2D estimator	67.8	40.4	0.105
Performance Year 3 2D estimator	71.0	52.9	0.191
Constant term	8.5	268.8	0.975
R^2	0.4453	—	—
Number of observations	404,981	—	—

NOTES:
DRG = diagnosis-related group; HCC=hierarchical condition category; IPPS = inpatient prospective payment system.

SOURCE: RTI processing of Medicare claims.

gain2_request2_apr22_2014

5.5 Discussion

One goal of the PHC Demonstration was to reduce hospitals' internal costs to levels sufficient to generate savings that could be shared with physicians. Medicare savings were not required, though these changes in incentives – if they resulting in lasting changed in physician practice behavior -- could theoretically result in impacts that might reduce Medicare's outlays per episode through reduced physician Part B charges. Our results based on the demonstration's full three years of data do not indicate evidence of these cost-saving changes in physician behavior for Medicare. In fact, as indicated above, the 2D effect on physician payments was about $70 per episode, implying faster spending growth in participating hospitals. It would appear that the PHC Demonstration, while it may have induced internal savings for hospitals, did little to influence physicians in ways that saved money for Medicare Part B. This is consistent with some of RTI's feedback from site visits indicating reductions in internal hospital costs came mainly from hospital management initiated programs, rather than driven by physician designed initiatives (e.g., through management sponsored programs to reduced testing, make more efficient use of hospital resources and supplies, and use of generic instead of branded drugs). While physician behavior changes might have helped hospitals achieve internal savings, such behavioral changes were not evident in Medicare physician payments.

Overall, we saw some promising findings relative to lower expenditures during year 2. However, during the last year of the demonstration PHC hospitals were not able to keep pace with changes at their comparison hospitals. In particular, PHC hospitals were not able to match the comparison's reduction in post-discharge SNF payments between PY 2 and PY 3. SNF payments went down for both PHC and comparisons hospitals, but more so for the comparison hospitals. And, for post-discharge inpatient payments (i.e., readmissions to short-term acute care hospitals and admissions to long-term care hospitals and rehabilitation hospitals), PHC payments increased while for the comparisons decreased between PY 2 and PY 3. An important question is why, in the absence of incentives, did SNF and post-discharge inpatient payments decline for the comparison hospitals between PY 2 and PY 3, an apparent indication of some secular trend occurring in at least New Jersey? And, given their payment incentives, why weren't the PHC hospitals able to match their comparison hospitals?

SECTION 6
QUALITY OF CARE

The internal cost-control strategies introduced by the aligned physician and hospital incentives under gainsharing were explicitly not to reduce – but rather possibly improve – patient quality of care. This section examines differences in quality of care between participants and comparison hospitals in the PHC Demonstration. Since individual measures often present a limited view of quality of care, we present a review of several measures of quality of care. Incentives introduced by the PHC hospitals to reduce internal hospital costs included reduced length of stay (LOS), reduced inpatient diagnostic testing, and reduced use of specialist consultations. Other incentives may include increased coordination of care, improved transitions of patients across care settings, and the development of targeted case management of high-risk patients. All of these incentives have the potential to directly or indirectly affect quality of care. Therefore, we analyzed a range of quality measures. Three data sources have been used in other CMS quality monitoring efforts: (1) Medicare claims, (2) medical records abstractions, and (3) beneficiary surveys. For this analysis, we utilized each of these data sources: claims-based quality measures, measures based on data abstracted from medical records (both presented below) and data from patient surveys (presented in chapter 7). The quality measures presented below and in the following chapter compare the three implementation years after the introduction of gainsharing to the hospital against the base year using difference-in-difference (2D) methodology described in chapter 5 and below.

6.1 Data Sources and Measures

Quality Indicators from the Agency for Healthcare Quality and Research: Administrative claims are a cost-effective means of measuring provider quality. Claims data are routinely collected as part of the delivery of hospital services and do not require additional data collection. These data include information on diagnoses, procedures, age, gender, admission source, and discharge status (Agency for Healthcare Research and Quality [AHRQ], 2007a,b). AHRQ developed four quality indicator (QI) modules that rely solely on inpatient claims data in order to measure quality of care in inpatient or outpatient settings.

Two QI modules are relevant to the evaluation: inpatient quality indicators (IQIs) and patient safety indicators (PSIs). IQIs include inpatient mortality for selected medical conditions and surgical procedures, utilization rates for selected procedures (where there may be a question of over-, under-, or misuse), and volume rates for selected procedures (where a high volume may be associated with lower mortality). PSIs are rates of potentially avoidable complications and iatrogenic events that are adjusted with diagnosis related group (DRG) relative weights (e.g., postoperative complications, death in low-mortality DRGs, and decubitus ulcers).

Data used for the quality outcomes and analyses come from Medicare Part A inpatient claims from September 2007 through September 2012. The base year evaluation period is based on admissions between October 2007 through September 2008, the year 1 evaluation period is July 2009 through June 2010, the year 2 evaluation period is July 2010 through June 2011, and the year 3 evaluation period is July 2011 through June 2012. The level of analysis is the episode of care. We built quality analytical files from the episode of care finder files jointly developed with Medicare claims (standardized to CMS DRG Version 24 codes) from the Data Extraction System pulls by RTI, and based on the core analytic file prepared by the Actuarial Research

Corporation (ARC). An episode of care is defined as the period beginning 14 days before the date of a qualifying admission and ending 90 days after discharge (thus requiring some data from September 2007 and through September 2012.[8] Claims data were pulled for beneficiaries receiving care from the 12 intervention hospitals and the hospitals in the comparison group. ***Table 6-1*** below presents the base year and performance year 3 counts of episodes of care used in the following analyses for the intervention hospitals and the hospitals that comprise the comparison group. On average, the demonstration hospitals had a 10 percent decline in episodes between the base year and performance year 3 and the comparison hospitals had a decline of 13 percent. The only demonstration hospitals that had an increase in episodes between the base year and year 3 were Overlook Hospital (12%) and Monmouth Hospital (3%). The demonstration hospitals with the largest decrease in episodes include: St. Francis Medical Center (-33%), Our Lady of Lourdes Medical Center (-26%) and JFK Medical Center (-20%).

The quality analysis consists of Medicare fee-for-service beneficiaries who have been continuously enrolled in both Medicare Part A and Part B and who have Medicare as their primary payer. Excluded from the analysis are beneficiaries enrolled in Medicare Part C; beneficiaries with end-stage renal disease; and beneficiaries receiving hospice care. Using the ID established for each episode of care, as well as the associated admission and discharge dates, we merged additional data needed to construct the quality analytical files. This includes information such as beneficiary race, State and county of residence, discharge status, details of admission, diagnoses coded, and procedures performed from Standard Analytical File (SAF) claims. We also merged data containing hierarchical condition category (HCC)-based risk scores (Pope et al., 2011). A number of variables were then constructed, including LOS, 30- and 90-day mortality, 90-day readmissions rate, and discharge quarter. Certain variables, such as race, admissions source, and primary payer, were then recoded to match the AHRQ QI software specifications. Once constructed and validated, the quality analytic file was then processed with the APR-DRG grouper followed by the AHRQ QI software (version 4.4) to risk-adjust the data and calculate the individual QIs. The AHRQ software creates flags to indicate whether an admission counts toward the numerator for a given indicator. We appended these flags to the quality analytic file for use in the difference-in-differences analyses.

[8] In the case of a beneficiary who is an inpatient of a hospital or skilled nursing facility, or who is covered by home health on the date that an episode of care would otherwise begin, the episode will begin on the day after discharge. Same-day transfers in from another IPPS hospital are excluded. Transfers from a skilled nursing facility or home health create a new episode. Same-day IPPS transfers out terminate the episode of care.

Table 6-1
Episodes of care for PHC hospitals and their comparison group during the base year and third implementation year

Hospitals	Base year episodes	Year 3 episodes	Percent change in episodes
Hunterdon Medical Center	2,098	2,033	-3%
Holy Name Hospital	3,820	3,623	-5%
Valley Hospital	8,403	7,544	-10%
St. Francis Medical Center	1,426	962	-33%
Our Lady of Lourdes Medical Center	3,655	2,688	-26%
Somerset Medical Center	4,071	3,647	-10%
Overlook Hospital	4,667	5,229	12%
Atlanticare Regional Medical Center	5,950	5,897	-1%
Jersey Shore University Medical Center	6,559	5,307	-19%
Monmouth Medical Center	2,506	2,573	3%
JFK Medical Center	4,342	3,495	-20%
Centrastate Medical Center	3,856	3,297	-14%
Demonstration hospitals	**51,353**	**46,295**	**-10%**
Comparison hospitals	**55,983**	**48,666**	**-13%**

SOURCE: 2007–2012 Medicare inpatient prospective payment system (IPPS) claims. PHC, Physician Hospital Collaboration.

Medical Record Based measures: Although claims data are able to provide measures of various patient outcomes that result from the provision of health care, they offer only limited insight into *how* that care was provided. To fully assess the impact of the Medicare PHC demonstration on quality of care, it was also necessary to examine possible changes in how care has been delivered in the demonstration and comparison hospitals. The level of detail necessary to generate information on process of care is available in patient medical records.

We analyzed 27 medical record-based hospital processes of care measures available through CMS. The Inpatient Quality Reporting (IQR) program collects data on designated quality measures from hospitals. Hospitals that successfully report designated quality measures are eligible for a higher annual update to their payment rates. Reported to CMS quarterly, IQR data include 3 different elements: 1) 27 questions from the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey aggregated into 10 measures; 2) Measures related to process of care for three conditions that are common to Medicare beneficiaries and often require hospitalization; and 3) Processes relevant to the Surgical Care Improvement Project

(SCIP).[9] Measures related to patient satisfaction from the HCAHPS survey are reported in Section 7.

The three conditions covered by IQR are acute myocardial infarction (AMI), heart failure (HF), and pneumonia. Hospitals report on eight measures related to AMI care, four measures related to HF care, seven measures that address pneumonia care, and seven measures related to SCIP. Below, we only report on six AMI measures because data was not available for two of the measures. Each of these evidence-based measures assesses treatment processes that are related to positive outcomes; data from a sample of patient charts are converted to rates. The construct of each measure is such that more is better (e.g., achieving a rate of 100 percent indicates that a particular process of care was followed for each patient in the sample). IQR data submissions must meet strict criteria; the data are validated and standardized, allowing for comparison between hospitals.

6.2 Methods

90-day Post discharge Methodology: As described above, the PHC demonstration created incentives to lower internal costs, and our site visits confirmed that reduction in LOS was a key strategy. There are certainly cases in which a patient's LOS is longer than medically necessary because of hospital inefficiencies (e.g., the physician not being available to sign discharge orders) that could be improved as a result of the gainsharing agreement between hospitals and physicians. In these instances, bringing LOS to performance norms may have a beneficial impact on patient quality as patients are removed from hospitals settings where infections and other known complications can occur even in high quality hospitals. On the other hand, there are also cases in which a shorter LOS may not be medically advantageous and could lead to a readmission or shifting of care to another facility, which would in turn negatively affect the overall cost to Medicare.

To account for these possibilities, the demonstration design utilized a 90-day post-discharge standard to define an episode of care. This accounts for readmissions to the same hospital or another facility as well as costs associated with post-discharge care. Thus, when considering savings to Medicare, the costs for the entire episode, and not simply the hospital stay, are considered. Because quality is an issue as well, indicators such as 30- and 90-day mortality and readmissions within 90 days of discharge can be measured in addition to IQIs and PSIs.[10]

Risk Adjustment: Outcome measures, including quality measures, are impacted by differences in the underlying health status and risk of patients. The AHRQ QI software uses the All-Patient Refined Diagnosis Related Group (APR-DRG) risk adjustment grouper developed by 3M Corporation to risk-adjust all data for patient severity. The grouper expands the scope of the DRG system by adding four subclasses to address patient differences related to severity of illness and risk of mortality. Severity of illness measures the extent of physiologic decompensation or

[9] See http://www.qualitynet.org for an overview of the Inpatient Quality Reporting program.

[10] 30- and 90-day mortality is calculated on the basis of date of admission, not date of discharge.

organ system loss of function ranging from 1 to 4. Risk of mortality is a measure of the likelihood of dying and there are four subclasses of mortality risk ranging from 1 through 4.[11]

Difference-in-differences (2D) Analysis: In order to estimate the impact of hospital gainsharing on quality a difference-in-differences (2D) analysis was used. The change from the base year to the pooled performance years (year 1, year 2 and year 3) were compared for both the intervention and demonstration hospitals. Subtracting the baseline difference in hospital quality from the demonstration difference eliminates any selection bias caused by any observable differences in hospitals as long as the differences are fixed over time.

Nonlinear models using the same specifications as described in Section 5.2 were estimated to determine the PHC impacts on hospital quality and patient safety. For nonlinear models (e.g., logit, probit, and Poisson count models), the estimated coefficient on the interaction term, $\hat{\gamma}_3$ cannot simply be exponentiated to estimate the 2D effect because the model is, in fact, nonlinear. Because the patient and hospital characteristics interact in a multiplicative rather than linear way, the mean of the differences between groups is not equal to the difference in mean differences. The standard method to derive 2D numerical estimates involves simulations (described in detail below). In these simulations, four dependent variables are estimated for each observation (episode) in the sample. Aside from the demonstration status (D) and the pre/post (T) variables, actual values for all of the other explanatory variables are used. Since there are 2 values each for D and T, four separate estimates of the dependent variable are calculated as follows:

1. For each observation i, a simulated dependent variable ($\hat{P}_i$) is calculated as if the observation is for an episode in the pre period by setting D to one and T to zero—see Cell 1 in ***Figure 6-1***.

2. For each observation i, $\hat{P}_i$ is calculated as if the observation is for an episode in the post period by setting D to one and T to one—see Cell 2 in Figure 6-1.

3. For each observation i, $\hat{P}_i$ is calculated as if the observation is for an episode in the pre period by setting D to zero and T to zero—see Cell 3 in Figure 6-1.

4. For each observation i, $\hat{P}_i$ is calculated as if the observation is for an episode in the post period by setting D to zero and T to one—see Cell 4 in Figure 6-1.

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[11] APR-DRGs are an enhanced extension of the basic DRG concept developed by 3M's Clinical Research Group, the National Association of Children's Hospitals and Research Institutes, and several physician groups.

Whereas DRGs focus on the Medicare population, APR-DRGs describe a complete cross-section of acute care patients and are specifically designed to adjust data for severity of illness (How sick is the patient?) and risk of mortality (How likely is it that the patient will die?). The fundamental principle of APR-DRGs is that the severity of illness and risk of mortality are both dependent on the patient's underlying condition. High severity of illness and risk of mortality are characterized by multiple serious diseases and the interactions between the disorders.

The estimated probabilities, $\hat{P}_i$ are derived from the logistic regression by the following transformation:

$$\hat{P}_i = \frac{e^{X_i'\hat{\beta}}}{1+e^{X_i'\hat{\beta}}} \quad (6\text{-}1)$$

where X represents all explanatory variables and not just the patient hospital characteristics. The X-characteristics (outlined in Section 5 above) are specific to a beneficiary and hospital in each time period.

For each observation, pre/post changes (ΔPP) are calculated as if the observation were for an episode at a demonstration hospital ($\Delta PP_{i,D=0}$) and as if the observation were for an episode at a comparison hospital ($\Delta PP_{i,D=0}$). The demonstration difference-in-differences effect for each episode is calculated by subtracting the comparison hospital pre/post change from participating hospital pre/post change:

$$2D_i = \Delta PP_{i,D=1} - \Delta PP_{i,D=0} \quad (6\text{-}2)$$

The average demonstration effect is then estimated by calculating the mean of the individual observation demonstration effects. We repeated the same process for each performance year to look at the year specific effects.

Figure 6-1
Components for Difference-in-Differences Calculations for Nonlinear Models

Group	Time Period		Changes for each group (post minus pre)
	T = 0 (pre)	T = 1 (post)	
Demo Participant (D = 1)	1 $\hat{P}_{i,D=1,T=0}$	2 $\hat{P}_{i,D=1,T=1}$	$\Delta PP_{i.D=1}$ = Cell 2 minus Cell 1
Comparison (D = 0)	3 $\hat{P}_{i,D=0,T=0}$	4 $\hat{P}_{i,D=0,T=1}$	$\Delta PP_{i,D=0}$ = Cell 4 minus Cell 3

NOTES:

D denotes the dummy variable used to distinguish between demonstration participants and the comparison population while T denotes the dummy variable used to distinguish between the pre and post periods.

The numbers in the shaded boxes are cell numbers.

Limitations: Claims provide a cost-effective, easily accessible source of quality data, but they are not without limitations. There is particular concern about the limitations of claims for measuring many process measures (and patient risk factors) because of their limited clinical information. We addressed this concern by balancing use of claims-based quality measures with those based on medical chart abstraction (presented below) and patient surveys (presented in chapter 7). In addition, the measures generated by the QI software are not standardized to account for variation in hospital volume, and therefore they are not appropriate for direct

comparison between hospitals. Finally, many conditions and procedures have only a small number of observations at the provider level. Small sample sizes are an issue as the resulting confidence intervals of any estimate are wide and the estimate may not be very precise.

6.3 Descriptive Results

We analyzed baseline and implementation year 3 measures of three patient outcomes: 30-day mortality, 90-day mortality, and 90-day readmissions. Hospitals trying to achieve savings may target reducing length of stay; if administrative inefficiencies contribute to longer-than-necessary LOS, a hospital could achieve cost savings by eliminating or reducing these inefficiencies. It is possible, however, that some patients may be discharged earlier than is optimal, which could result in a readmission to the hospital or even death. Therefore we considered 30-day and 90-day mortality (mortality that occurs within 30 or 90 days of the relevant admission) and readmissions to any facility within 90 days. The measure of 30-day mortality is a flag (yes or no) indicating whether the patient died within 30 days of the admission that triggered the qualifying episode of care. Similarly, the 90-day mortality measure is a flag (yes or no) indicating whether the patient died within 90 days of the qualifying admission.

An all-cause 90-day readmission is based on the discharge associated with the qualifying episode of care admission. It is defined as any inpatient hospital admission for any condition, to any inpatient prospective payment system (IPPS) or critical access hospital (CAH) that occurs at least 1 day after and within 90 days of the related discharge. Therefore same-day transfers to another facility are not counted as readmissions in this analysis.

30- and 90-Day Mortality: Rates of 30-day mortality for the base year and the third performance year are presented in ***Table 6-2***. In the base year 30-day mortality rates ranged from 2.35 percent at Monmouth Medical Center to 7.54 percent at Overlook Hospital. The comparison group hospitals had 30-day mortality rates of 4.88 percent and the intervention hospitals had a rate of 4.83 percent in the base year. Both rates decreased in the third performance year; the comparison hospitals fell to 4.63 percent and the intervention hospitals fell to 4.71 percent. The overall decrease between the base year and the final performance year was 5.13 percent in the comparison hospitals and 2.45 percent in the demonstration hospitals. We note however that the rates were higher at baseline for the comparison sites and hence they had more potential for improvement over time. Alternatively, while the comparison hospitals had a higher mortality rates at baseline, their rates dropped slightly below the demonstration hospitals by the third performance year. The rates of 30-day mortality among participating hospitals in the final implementation year ranged from 1.83 percent (Monmouth Medical Center) to 6.36 percent (Somerset Medical Center). On average, 30-day mortality decreased by 2.74 percent from the base year to the third performance year, with a range of 23.68 percent (Overlook Hospital) to 18.57 percent (Atlanticare Regional Medical Center).

Table 6-2
Base year and Year 3 rates of 30-day mortality for PHC hospitals and their comparison group

Hospital	Base year deaths	Base year 30-day mortality rate	Year 3 deaths	Year 3 30-day mortality rate	Percentage change in mortality rate
Hunterdon Medical Center	105	5.00%	101	4.97%	-0.73%
Holy Name Hospital	163	4.27%	162	4.47%	4.79%
Valley Hospital	450	5.36%	336	4.45%	-16.83%
St Francis Medical Center	65	4.56%	48	4.99%	9.46%
Our Lady of Lourdes Medical Center	147	4.02%	118	4.39%	9.15%
Somerset Medical Center	249	6.12%	232	6.36%	4.00%
Overlook Hospital	352	7.54%	301	5.76%	-23.68%
Atlanticare Regional Medical Center	217	3.65%	255	4.32%	18.57%
Jersey Shore University Medical Center	286	4.36%	237	4.47%	2.42%
Monmouth Medical Center	59	2.35%	47	1.83%	-22.41%
JFK Medical Center	215	4.95%	196	5.61%	13.26%
Centrastate Medical Center	172	4.46%	148	4.49%	0.64%
Demonstration hospitals	**2,480**	**4.83%**	**2,181**	**4.71%**	**-2.45%**
Comparison hospitals	**2,732**	**4.88%**	**2,253**	**4.63%**	**-5.13%**

SOURCE: 2007–2012 Medicare inpatient prospective payment system (IPPS) claims. PHC, Physician Hospital Collaboration.

Figure 6-2 presents the rates of 30-day mortality for each intervention hospital against the comparison group for the base year and all three performance years. While the comparison group has very little fluctuation in rates across the four years, the rates at the intervention hospitals generally vary across years. There is no consistent pattern in the variation of each intervention hospital.

Figure 6-2
Rates of 30-day mortality for PHC hospitals and their comparison group

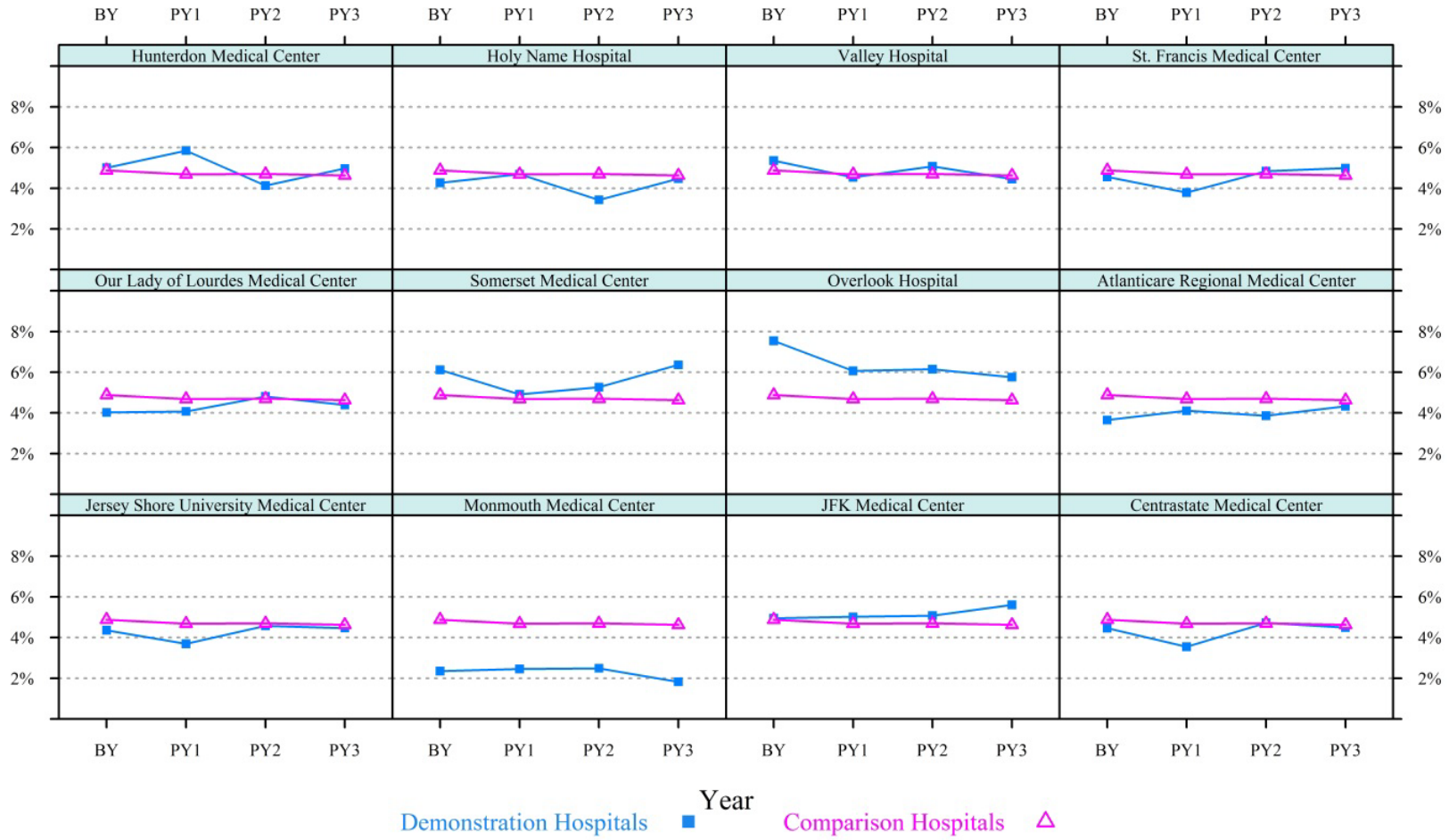


Table 6-3 shows both base year and performance year 3 rates of 90-day mortality for each intervention hospital, the aggregate of the demonstration hospitals and for the comparison hospitals. During the base year, the rate of 90-day mortality was 7.81 percent in the demonstration hospitals and 8.06 in the comparison hospitals. Similar to the findings for 30-day mortality, we note that the comparison hospitals exhibited a higher rate at baseline but reduced mortality to below the PHC hospitals by the third performance year. Among the demonstration hospitals the 90-day mortality rate ranged from 3.71 percent at Monmouth Medical Center to 11.76 percent at Overlook Hospital in the base year. In the third year of the demonstration, the rate of 90-day mortality was 7.40 percent at the comparison hospitals and 7.55 percent at the demonstration hospitals. The rate ranged from 3.15 percent at Monmouth Medical Center to 10.06 percent at Somerset Medical Center. The average percentage change between the base year and third implementation year was -3.40 percent across the participating hospitals, with a range of -22.13 percent at Overlook Hospital to 11.06 percent at Our Lady of Lourdes Medical Center. The rate of 90-day mortality decreased by 8.19 percent at the comparison hospitals.

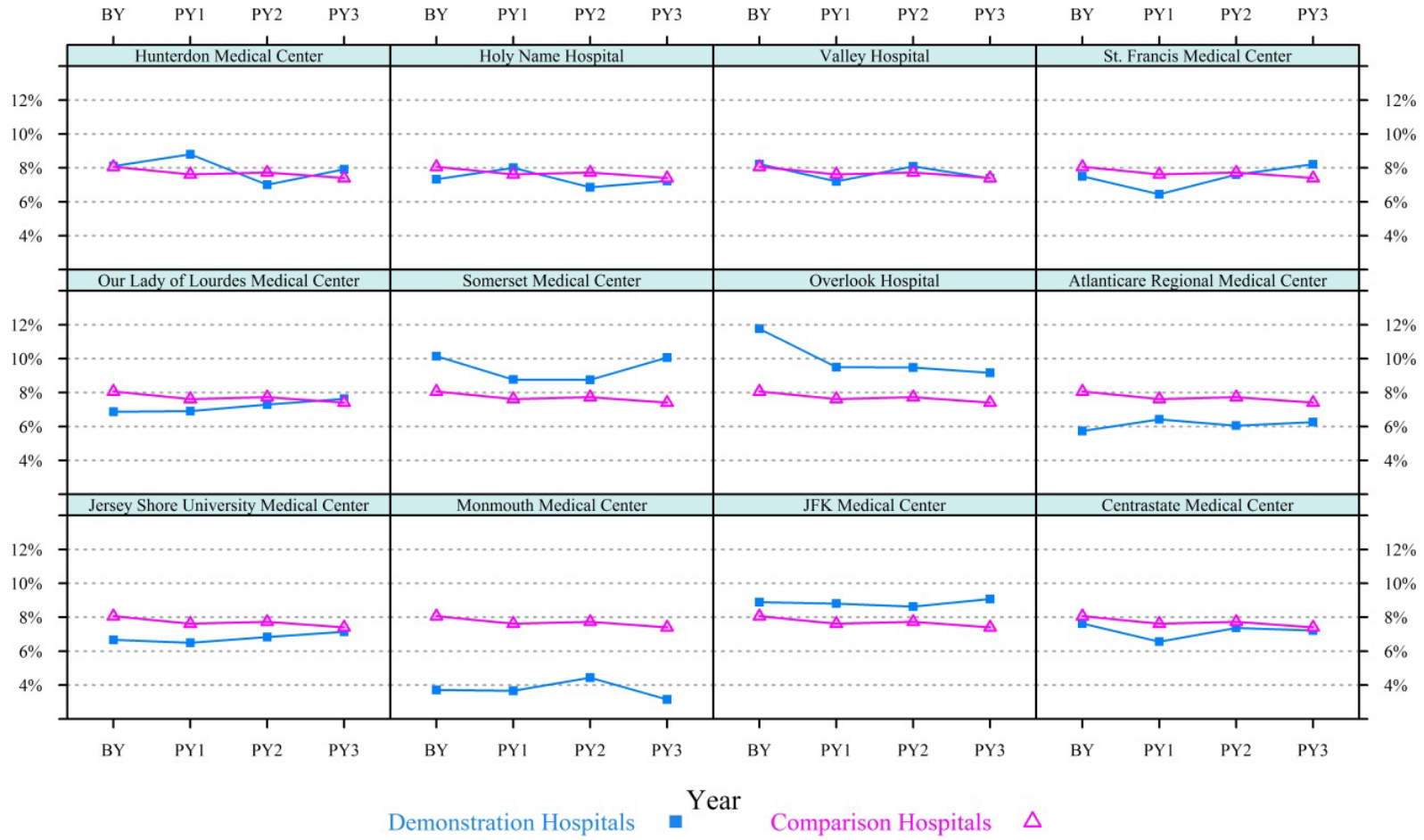
Table 6-3
Base year and Year 3 rates of 90-day mortality for PHC hospitals and their comparison group

Hospital	Base year deaths	Base year 90-day mortality rate	Year 3 deaths	Year 3 90-day mortality rate	Percentage change in mortality rate
Hunterdon Medical Center	170	8.10%	161	7.92%	-2.27%
Holy Name Hospital	280	7.33%	262	7.23%	-1.34%
Valley Hospital	691	8.22%	557	7.38%	-10.21%
St Francis Medical Center	107	7.50%	79	8.21%	9.44%
Our Lady of Lourdes Medical Center	251	6.87%	205	7.63%	11.06%
Somerset Medical Center	413	10.14%	367	10.06%	-0.81%
Overlook Hospital	549	11.76%	479	9.16%	-22.13%
Atlanticare Regional Medical Center	341	5.73%	369	6.26%	9.18%
Jersey Shore University Medical Center	437	6.66%	379	7.14%	7.19%
Monmouth Medical Center	93	3.71%	81	3.15%	-15.17%
JFK Medical Center	386	8.89%	317	9.07%	2.03%
Centrastate Medical Center	294	7.62%	238	7.22%	-5.32%
Demonstration hospitals	**4,012**	**7.81%**	**3,494**	**7.55%**	**-3.40%**
Comparison hospitals	**4,513**	**8.06%**	**3,602**	**7.40%**	**-8.19%**

SOURCE: 2007–2012 Medicare inpatient prospective payment system (IPPS) claims. PHC, Physician Hospital Collaboration.

Figure 6-3 presents rates of 90-day mortality for each intervention hospital against the comparison group for the base year and all three performance years. Rates at the comparison hospitals vary across years for some hospitals more than others with no consistent pattern among hospitals. For example, the rate at Overlook Hospital decreases from the base period to the first performance year, and then remains fairly stable. While the comparison group has very little fluctuation in rates across the four years, the rates do decline slightly between the base period and third performance period.

Figure 6-3
Rates of 90-day mortality for PHC hospitals and their comparison group



Readmissions: Table 6-4 presents all cause readmissions for the twelve PHC hospitals and for the group of comparison hospitals in the base year and third implementation year. Readmissions were counted if they occurred within 90 days and at least one day after discharge from the qualifying hospital stay, regardless of where the readmission occurred. The readmission rate at the comparison hospitals ranged from 28.52 percent in the base year to 27.08 percent in performance year 3, a 5.05 percent decrease. Among the participating hospitals, Overlook Hospital had the lowest rate of readmissions in both the base and third implementation years (25.61 and 24.36 percent, respectively). During the base year St. Francis Medical Center had the highest rate of readmissions, 31.49 percent. Our Lady of Lourdes Medical Center had the highest readmissions rate in the third performance year (29.28%). On average, readmissions decreased in the PHC hospitals by 5.52 percent between the base year and the third year of the demonstration. The change in readmissions ranged from -11.21 percent at Hunterdon Medical Center to 7.77 percent at Our Lady of Lourdes Medical Center.

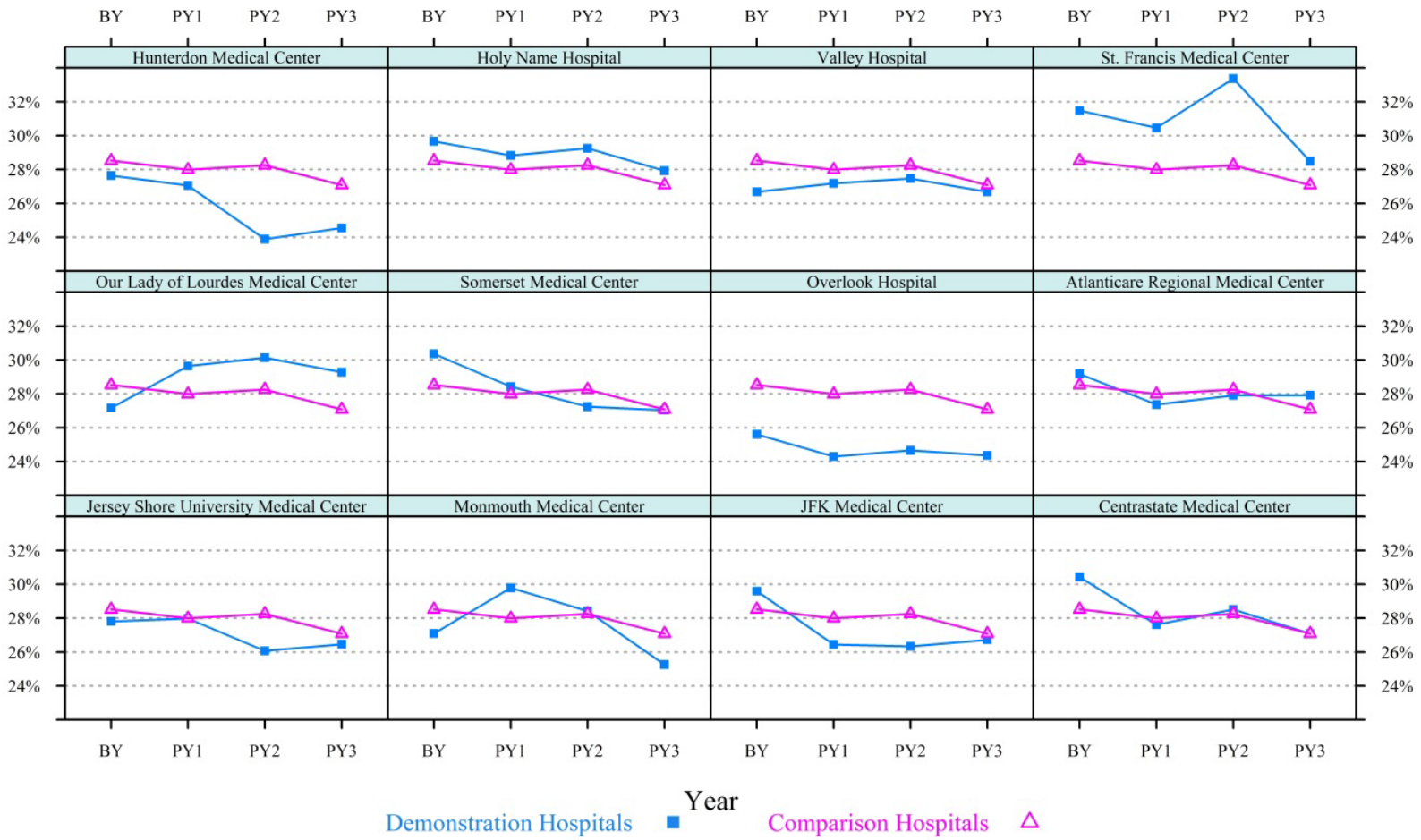
Table 6-4
Base year and Year 3 rates of all cause 90-day readmissions for PHC hospitals and their comparison group

Hospital	Base year count	Base year readmission rate	Year 3 count	Year 3 readmission rate	Percentage change in readmissions
Hunterdon Medical Center	580	27.65%	499	24.55%	-11.21%
Holy Name Hospital	1,133	29.66%	1,012	27.93%	-5.82%
Valley Hospital	2,242	26.68%	2,013	26.68%	0.01%
St Francis Medical Center	449	31.49%	274	28.48%	-9.54%
Our Lady of Lourdes Medical Center	993	27.17%	787	29.28%	7.77%
Somerset Medical Center	1,236	30.36%	986	27.04%	-10.95%
Overlook Hospital	1,195	25.61%	1,274	24.36%	-4.85%
Atlanticare Regional Medical Center	1,736	29.18%	1,646	27.91%	-4.33%
Jersey Shore University Medical Center	1,824	27.81%	1,404	26.46%	-4.87%
Monmouth Medical Center	679	27.09%	650	25.26%	-6.76%
JFK Medical Center	1,285	29.59%	934	26.72%	-9.70%
Centrastate Medical Center	1,173	30.42%	893	27.09%	-10.96%
Demonstration hospitals	**14,525**	**28.28%**	**12,372**	**26.72%**	**-5.52%**
Comparison hospitals	**15,968**	**28.52%**	**13,180**	**27.08%**	**-5.05%**

SOURCE: 2007–2012 Medicare inpatient prospective payment system (IPPS) claims. PHC, Physician Hospital Collaboration.

Rates of 90-day all-cause readmission for each intervention hospital against the comparison group for the base year and all three performance years are presented in ***Figure 6-4***. The comparison group has an overall decline in rates between the base period and the third performance period with a slight increase from the first to second performance years. In all but one case (Our Lady of Lourdes Medical Center) the rates at the intervention hospitals declined or were almost identical between the base period and third performance period. However, across intervention hospitals there was variation in how the rates fluctuated across the four years.

Figure 6-4
Rates of 90-day readmissions for PHC hospitals and their comparison group



Inpatient Quality Indicator Findings: The AHRQ IQIs are a set of measures providing rates of volume of specific high-technology, or highly complex, procedures; mortality indicators for certain inpatient procedures; mortality indicators for certain inpatient conditions; and utilization rates for certain procedures that vary greatly across hospitals. ***Appendix Tables 6-1 through 6-4*** present the base year and three performance year results generated by the AHRQ IQI software for each of the specific conditions below:

- Acute myocardial infarction (AMI)
- Congestive heart failure (CHF)
- Stroke
- Gastrointestinal hemorrhage (GI hemorrhage)
- Hip fracture
- Pneumonia

Because the IQIs measure mortality rates among patients treated for only the six conditions above, the population at risk for any measure at a single hospital may be quite small. To address this in the 2D analysis of impact of the demonstration, we use a simple composite variable to measure whether a patient died while being treated for any one of the six conditions during the time period (base year or demonstration year 3). ***Table 6-5*** presents base year and year 3 mortality rates per 1,000 episodes across all six conditions for each intervention hospital and the comparison hospitals. "Population at risk" refers to any patient who meets all exclusion criteria and is treated for at least one of the conditions above. "Occurrences" refers to deaths of patients in the population at risk. Thus, the mortality rate is the observed mortality rate among patients treated for AMI, CHF, stroke, GI hemorrhage, hip fracture, or pneumonia during the measurement period. We then compare the percentage change in the year 3 rate from the base year rate. If the percentage is positive, the hospital had a higher mortality rate across the six conditions in the third year of the demonstration relative to the base year. It is important to note that year-to-year change in rates may appear large because the population size for each hospital is relatively small. Therefore these numbers should only be interpreted along with the 2D analyses presented below. Detailed rates for the 6 components of the composite measure are presented in ***Appendix Tables 6-1 through 6-4***.

Two demonstration hospitals had increased mortality rates between the base year and the third intervention year: Hunterdon Medical Center had a 26 percent increase and Atlanticare Regional Medical Center had an 11 percent increase. The remaining 10 hospitals had decreases from their baseline mortality rate ranging from a decrease of 38 percent at St. Francis Medical Center to an 8 percent decline at JFK Medical Center and Our Lady of Lourdes Medical Center. The comparison group had an overall increase of 2 percent between the base year and third performance year and the demonstration hospitals as a group experienced a 16 percent decline in the same period.

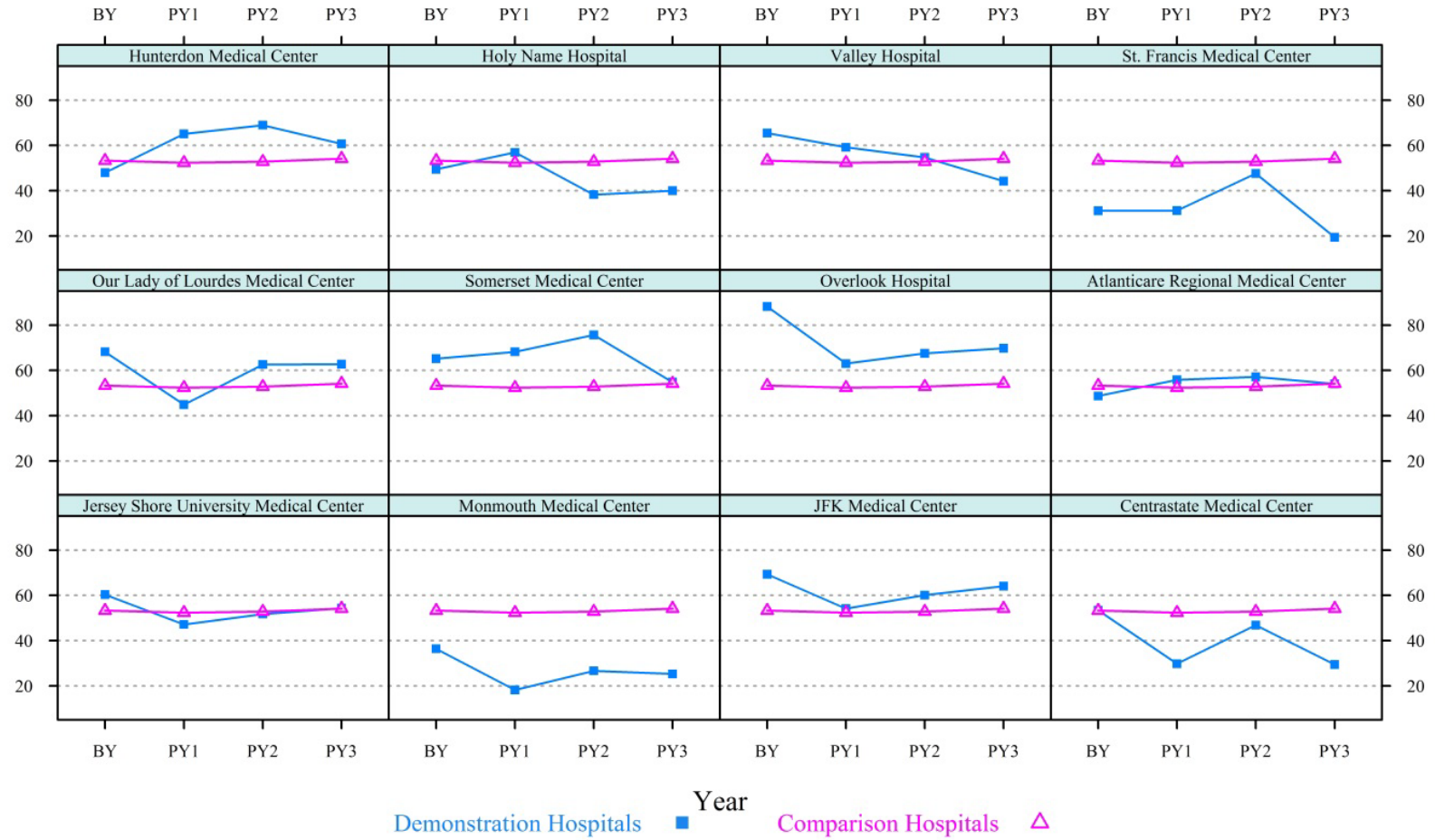
Figure 6-5 presents the mortality rates per 1,000 episodes for selected conditions for each intervention hospital and the comparison group for the base year and all three performance years. While the comparison group has very little fluctuation in rates across the four years, the rates at the intervention hospitals generally vary across years without a consistent pattern in the variation across hospitals.

Table 6-5
Base year and year 3 mortality rates per 1,000 episodes for selected conditions: PHC hospitals and their comparison group

Hospital	Base year population at risk	Base year occurrences	Base year rate	Year 3 population at risk	Year 3 occurrences	Year 3 rate	Percentage change in mortality rate
Hunterdon Medical Center	375	18	48.00	379	23	60.69	26%
Holy Name Hospital	687	34	49.49	600	24	40.00	-19%
Valley Hospital	1,604	105	65.46	1514	67	44.25	-32%
St Francis Medical Center	257	8	31.13	206	4	19.42	-38%
Our Lady of Lourdes Medical Center	689	47	68.21	542	34	62.73	-8%
Somerset Medical Center	752	49	65.16	748	41	54.81	-16%
Overlook Hospital	1,145	101	88.21	1132	79	69.79	-21%
Atlanticare Regional Medical Center	986	48	48.68	981	53	54.03	11%
Jersey Shore University Medical Center	1,028	62	60.31	975	53	54.36	-10%
Monmouth Medical Center	412	15	36.41	356	9	25.28	-31%
JFK Medical Center	736	51	69.29	765	49	64.05	-8%
Centrastate Medical Center	674	36	53.41	578	17	29.41	-45%
Demonstration hospitals	**9,345**	**574**	**61.42**	**8,776**	**453**	51.62	**-16%**
Comparison hospitals	**9,605**	**512**	**53.31**	**8,475**	**459**	54.16	**2%**

SOURCE: 2007–2012 Medicare inpatient prospective payment system (IPPS) claims. PHC, Physician Hospital Collaboration.

Figure 6-5
Mortality rates per 1,000 episodes for selected conditions for PHC hospitals and their comparison group



Patient Safety Indicator Findings: The AHRQ PSIs are a set of measures providing rates of potentially preventable complications and other iatrogenic events that occur in the hospital setting. These are limited to cases in which a secondary diagnosis code indicates a potentially preventable complication. The PSIs include 20 provider-level indicators and 7 area-level indicators. We focus on the following 13 indicators that are appropriate for the Medicare population:

- Physiologic and metabolic derangements
- Postoperative respiratory failure
- Postoperative pulmonary Death in low-mortality DRGs
- Pressure ulcer*
- Death among surgical patients
- Iatrogenic pneumothorax
- Central venous catheter-related bloodstream infections*
- Postoperative hip fracture*
- Postoperative hemorrhage or hematoma
- Postoperative embolism or deep vein thrombosis*
- Postoperative sepsis
- Postoperative wound dehiscence
- Accidental puncture or laceration

*Included in CMS' POA-HAC payment penalty program

For each complication listed above, the observed rate is the actual number of occurrences per 10,000 patients. Detailed descriptions of the complications are presented for the base year and each intervention year in ***Appendix Tables 6-5 through 6-8.***

Because the PSIs measure the rate of occurrence of adverse events, the number of these events at a single hospital is likely to be quite small. To address this in the 2D analysis of the demonstration, we use a simple composite variable to measure whether a patient experienced at least one adverse event during an episode during the time period under consideration. ***Table 6-6*** presents base year and performance year 3 rates of adverse events per 10,000 episodes for each intervention hospital and the comparison hospitals. "Population at risk" refers to any patient who meets all exclusion criteria; almost all of the patients qualified to be in the denominator. "Occurrences" refers to an occurrence of an adverse event. We compare the percentage change in the year 3 rate from the base year rate. If the percentage is positive, the hospital had a higher rate of adverse events in the third year of the demonstration relative to the base year.

In most cases the change in rates of adverse events between the base year and performance year 3 seem large. It is important to note that year-to-year change in rates may appear large because the number of occurrences for each hospital is relatively small. Therefore these numbers are informational and should only be interpreted along with the 2D analyses presented below. Only one of the demonstration hospitals had a higher rate of adverse events in the third

Table 6-6
Base year and year 3 rates of adverse events per 10,000 episodes: PHC hospitals and their comparison group

Hospital	Base year population at risk	Base year occurrences	Base year rate	Year 3 population at risk	Year 3 occurrences	Year 3 rate	Percentage change in mortality rate
Hunterdon Medical Center	6,140	16	26.06	5,646	6	10.63	-59%
Holy Name Hospital	11,567	45	38.90	9,818	14	14.26	-63%
Valley Hospital	25,409	66	25.98	21,737	39	17.94	-31%
St Francis Medical Center	4,193	11	26.23	2,786	11	39.48	51%
Our Lady of Lourdes Medical Center	11,123	30	26.97	7,369	19	25.78	-4%
Somerset Medical Center	11,826	47	39.74	9,890	20	20.22	-49%
Overlook Hospital	14,373	71	49.40	15,439	45	29.15	-41%
Atlanticare Regional Medical Center	17,238	47	27.27	16,600	21	12.65	-54%
Jersey Shore University Medical Center	19,985	50	25.02	15,890	21	13.22	-47%
Monmouth Medical Center	7,904	29	36.69	7,481	14	18.71	-49%
JFK Medical Center	12,997	44	33.85	10,557	23	21.79	-36%
Centrastate Medical Center	11,254	41	36.43	9,045	16	17.69	-51%
Demonstration hospitals	**154,009**	**497**	**32.27**	**132,258**	**249**	**18.83**	**-42%**
Comparison hospitals	**167,023**	**504**	**30.18**	**138,289**	**218**	**15.76**	**-48%**

SOURCE: 2007–2012 Medicare inpatient prospective payment system (IPPS) claims. PHC, Physician Hospital Collaboration.

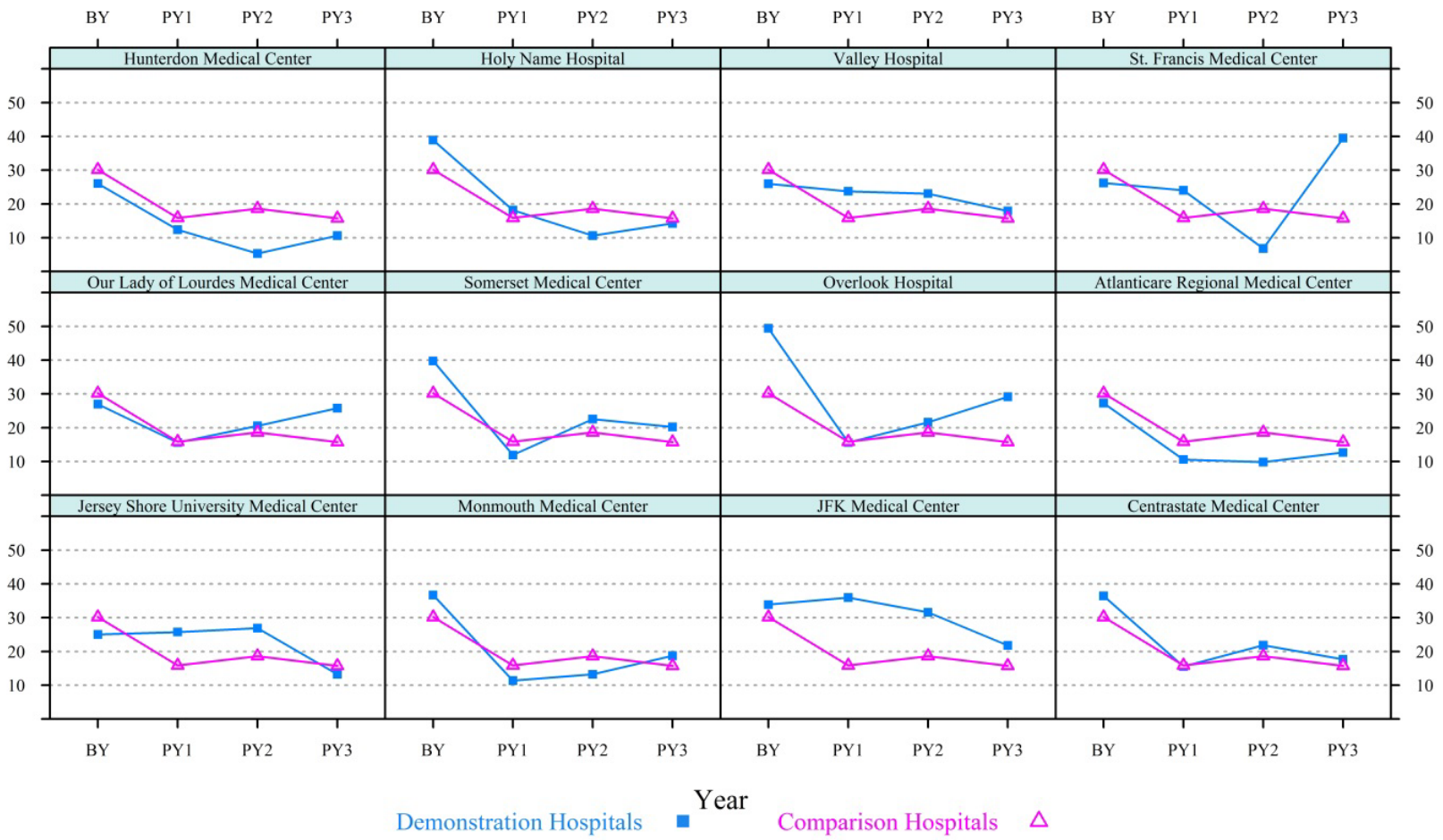
demonstration year relative to the base year: St. Francis Medical Center (51 percent increase). The remaining 11 hospitals experienced declines in the rate of adverse events ranging from 4 percent at Our Lady of Lourdes Medical Center to 63 percent at Holy Name Hospital. The comparison hospitals experienced an average decline of 48 percent between the baseline and third performance year and the demonstration hospitals had an average decline of 42 percent.

Figure 6-6 presents rates of adverse events per 10,000 episodes for each intervention hospital against the comparison group for the base year and all three performance years. Rates at the comparison hospitals vary across years with no consistent pattern among hospitals. The comparison group has a decrease in rates across the four years; the rates in the three performance years are noticeably lower than the base year rate.

Medical Record Based Data Findings: The Inpatient Quality Reporting data measure adherence to process of care standards for three conditions and process measures for surgery from the surgical care improvement project (SCIP). These processes are related to improved patient outcomes, and include the following:

- AMI (6 measures)
  - Aspirin at arrival
  - Aspirin prescribed at discharge
  - Angiotensin converting enzyme (ACE) inhibitor or angiotensin receptor blocker (ARB) for left ventricular systolic dysfunction (LVSD)
  - Beta blocker at discharge
  - Percutaneous coronary intervention received within 90 minutes of hospital arrival
  - Smoking cessation advice and counseling
- HF (4 measures)
  - Evaluation of left ventricular systolic function
  - ACE inhibitor or ARB for LVSD
  - Smoking cessation advice and counseling
  - Discharge instructions
- Pneumonia (7 measures)
  - Oxygenation assessment
  - Pneumococcal vaccination
  - Blood cultures performed in the emergency department before initial antibiotic received in hospital
  - Smoking cessation advice and counseling
  - Initial antibiotic received within 6 hours of hospital arrival
  - Initial antibiotic selection for community-acquired pneumonia in immunocompetent patients;
  - Influenza vaccination

Figure 6-6
Rates of adverse events per 10,000 episodes for PHC hospitals and their comparison group



- SCIP (7 measures)
  - Prophylactic antibiotic received within 1 hour before surgical incision
  - Prophylactic antibiotic selection for surgical patients
  - Prophylactic antibiotic discontinued within 24 hours after surgery end time
  - Surgery patients with recommended venous thromboembolism prophylaxis ordered
  - Surgery patients who received appropriate venous thromboembolism prophylaxis within 24 hours before surgery to 24 hours after surgery
  - Cardiac surgery patients with controlled 6:00 a.m. postoperative blood glucose
  - Surgery patients with appropriate hair removal.

In each case, the numerator is the number of patients receiving the intervention (e.g., aspirin at arrival for AMI patients). The denominator is the count of all relevant (e.g., AMI in the numerator example) adult patients who are eligible for inclusion in the numerator (i.e., patients with a known aspirin allergy would be excluded from the numerator and denominator in the example above). The measure is then the percentage of eligible patients who receive the intervention. In addition to the individual measures, above, we calculated a simple composite measure for each topic (AMI, HF, pneumonia, and SCIP). The composite measure is calculated by summing the numerator and denominator for each measure in a topic and dividing the numerator by the denominator to get a rate.[12]

We used quarterly IQR data provided by CMS. To generate a rate for the comparison group, we summed the numerator and denominator for each measure across all four quarters and across each hospital. We then divided the numerator by the denominator to calculate the rate, which can be interpreted as the percentage of eligible patients across all of the comparison hospitals who received the intervention. Results for each topic are presented in ***Tables 6-7 through 6-10.***

Acute Myocardial Infarction (Heart Attack) Care: The AMI process of care measures for each intervention hospital and the comparison hospitals as a group can be found in ***Table 6-7***. ***Appendix Tables 6-9 through 6-11*** show the base year and first two performance year results. In the third implementation year the composite scores ranged from 98 to 100 percent. While the range across most interventions was narrow, there was more variation in the percentage of patients receiving primary PCI within 90 minutes of arriving at the hospital; this ranged from 79 to 100 percent at St. Francis Medical Center and Monmouth Medical Center respectively.

The percentage of AMI patients receiving each intervention is greater than 90 percent for the remaining measures at all hospitals. This is an improvement from previous performance years when a minority of hospitals was performing the appropriate procedures approximately 85 percent of the time. Comparison hospitals, on the other hand, delivered PCI within 90 minutes of arrival at the hospital 90 percent of the time.

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[12] The composite score is calculated using the Hospital Core Performance Measurement (HCPM) opportunity model methodology. This requires summing the raw numerator for each measure within a topic (AMI, HF, pneumonia, or SCIP) and summing the raw denominator for that topic, then dividing numerator by denominator.

Table 6-7
Year 3 hospital process of care measures: AMI, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Aspirin at arrival	Aspirin prescribed at discharge	ACEI or ARB for LVSD	Adult smoking cessation advice/counseling	Beta blocker prescribed at discharge	Primary PCI received within 90 minutes of hospital arrival	AMI composite score
Hunterdon Medical Center							
# patients	129	78	11	21	78	33	**350**
% receiving	*98%*	*100%*	*100%*	*95%*	*97%*	*94%*	**98%**
Holy Name Hospital							
# patients	211	146	35	25	146	22	**585**
% receiving	*100%*	*100%*	*100%*	*100%*	*100%*	*95%*	**100%**
Valley Hospital							
# patients	296	270	34	37	281	40	**958**
% receiving	*98%*	*98%*	*100%*	*100%*	*98%*	*95%*	**98%**
St Francis Medical Center							
# patients	276	258	42	81	251	15	**923**
% receiving	*100%*	*100%*	*100%*	*100%*	*100%*	*93%*	**100%**
Our Lady of Lourdes Medical Center							
# patients	315	297	58	73	278	28	**1,049**
% receiving	*100%*	*99%*	*98%*	*100%*	*100%*	*96%*	**99%**
Somerset Medical Center							
# patients	290	234	38	60	236	72	**930**
% receiving	*98%*	*99%*	*97%*	*100%*	*97%*	*92%*	**98%**
Overlook Hospital							
# patients	266	207	41	44	209	45	**812**
% receiving	*99%*	*98%*	*93%*	*100%*	*100%*	*89%*	**98%**

(continued)

Table 6-7 (continued)
Year 3 hospital process of care measures: AMI, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Aspirin at arrival	Aspirin prescribed at discharge	ACEI or ARB for LVSD	Adult smoking cessation advice/counseling	Beta blocker prescribed at discharge	Primary PCI received within 90 minutes of hospital arrival	AMI composite score
Atlanticare Regional Medical Center							
# patients	364	338	63	122	328	77	**1,292**
% receiving	*99%*	*99%*	*100%*	*100%*	*100%*	*94%*	**99%**
Jersey Shore University Medical Center							
# patients	501	470	79	135	458	35	**1,678**
% receiving	*99%*	*99%*	*100%*	*100%*	*99%*	*86%*	**99%**
Monmouth Medical Center							
# patients	101	54	0	13	59	15	**242**
% receiving	*100%*	*100%*	*n/a*	*100%*	*100%*	*93%*	**100%**
JFK Medical Center							
# patients	244	163	19	26	169	54	**675**
% receiving	*98%*	*99%*	*100%*	*100%*	*100%*	*87%*	**98%**
Centrastate Medical Center							
# patients	108	39	0	0	43	0	**190**
% receiving	*100%*	*100%*	*n/a*	*n/a*	*95%*	*n/a*	**99%**
Comparison Hospitals							
# patients	3,657	2,648	465	583	2,624	457	**10,434**
% receiving	*99%*	*99%*	*98%*	*100%*	*99%*	*90%*	**99%**

NOTE: The composite score is calculated by summing the numerator and denominator for each measure in a topic and then dividing numerator by denominator to get the rate.

SOURCE: 2011Q3 - 2012Q2 Inpatient Quality Reporting (formerly Reporting Hospital Quality Data for Annual Payment Update) data

Heart Failure Care: Table 6-8 presents hospital process of care measures for treating patients with heart failure in the third performance year. ***Appendix Tables 6-12 through 6-14*** present the base year and first two performance year results. The range of the composite score for the third intervention year ranges from 93 percent at Hunterdon Medical Center to 100 percent at 5 hospitals. The majority of scores for each intervention range between 90 percent and 100 percent although in some cases the percentage of patients receiving a particular intervention was lower. Among patients treated for heart failure at JFK Medical Center and Hunterdon Medical Center, 87 and 88 percent received discharge instructions. Heart failure patients at Hunterdon Medical Center were treated for LVSD with an ACE inhibitor or ARB 77 percent of the time.

Pneumonia Care: The process of care measures for pneumonia patients are presented in ***Table 6-9***. ***Appendix Tables 6-15 through 6-17*** present the results for the base year and first two performance years. In the third intervention year, composite scores range from 96 to 99 percent. All hospitals provided the recommended care to more than 90 percent of patients.

Surgical Care Improvement Project: The surgical care improvement project (SCIP) process of care measures for the intervention hospitals and the comparison group are presented in ***Table 6-10***. The base year and first two performance year results are shown in ***Appendix Tables 6-18 through 6-20.*** In year 3 the SCIP composite scores ranged from 97 percent to 99 percent at 5 hospitals. There is very little variation in the SCIP measures; all hospitals had at least 90 percent compliance.

Table 6-8
Year 3 hospital process of care measures: heart failure, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Discharge instructions	Evaluation LVS function	ACE inhibitor or ARB for LVSD	Adult smoking cessation advice/ counseling	HF composite score
Hunterdon Medical Center					
# patients	107	155	42	13	**317**
% receiving	*89%*	*99%*	*81%*	*100%*	***93%***
Holy Name Hospital					
# patients	227	322	87	29	**665**
% receiving	*100%*	*100%*	*100%*	*100%*	***100%***
Valley Hospital					
# patients	230	323	76	21	**650**
% receiving	*96%*	*100%*	*100%*	*100%*	***99%***
St Francis Medical Center					
# patients	209	255	84	49	**597**
% receiving	*100%*	*100%*	*100%*	*100%*	***100%***

(continued)

Table 6-8 (continued)
Year 3 hospital process of care measures: heart failure, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Discharge instructions	Evaluation LVS function	ACE inhibitor or ARB for LVSD	Adult Smoking cessation advice/ counseling	HF composite score
Our Lady of Lourdes Medical Center					
# patients	266	313	86	55	**720**
% receiving	*99%*	*100%*	*100%*	*100%*	***100%***
Somerset Medical Center					
# patients	191	303	75	31	**600**
% receiving	*98%*	*99%*	*97%*	*100%*	***98%***
Overlook Hospital					
# patients	250	350	94	33	**727**
% receiving	*98%*	*100%*	*96%*	*94%*	***99%***
Atlanticare Regional Medical Center					
# patients	459	583	199	112	**1353**
% receiving	*100%*	*100%*	*99%*	*100%*	***100%***
Jersey Shore University Medical Center					
# patients	229	332	103	49	**713**
% receiving	*95%*	*100%*	*100%*	*100%*	***98%***
Monmouth Medical Center					
# patients	180	276	44	36	**536**
% receiving	*99%*	*100%*	*98%*	*100%*	***100%***
JFK Medical Center					
# patients	367	542	155	55	**1119**
% receiving	*88%*	*100%*	*97%*	*100%*	***96%***
Centrastate Medical Center					
# patients	220	341	75	20	**656**
% receiving	*95%*	*100%*	*99%*	*100%*	**98%**
Comparison Hospitals					
# patients	4962	7102	1677	820	**14561**
% receiving	*96%*	*100%*	*99%*	*100%*	***98%***

NOTE: The composite score is calculated by summing the numerator and denominator for each measure in a topic and then dividing numerator by denominator to get the rate.

SOURCE: 2011Q3 - 2012Q2 Inpatient Quality Reporting (formerly Reporting Hospital Quality Data for Annual Payment Update) data

Table 6-9
Year 3 hospital process of care measures: pneumonia, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Pneumococcal vaccination	Blood cultures performed in the emergency department prior to initial antibiotic received in hospital	Adult smoking cessation advice/counseling	Initial antibiotic received within 6 hours of hospital arrival	Initial antibiotic selection for CAP in immunocompetent patient	Influenza vaccination	Pneumonia composite score
Hunterdon Medical Center							
# patients	149	179	38	156	121	48	**691**
% receiving	*96%*	*99%*	*100%*	*95%*	*96%*	*96%*	**97%**
Holy Name Hospital							
# patients	170	208	27	197	144	60	**806**
% receiving	*100%*	*100%*	*100%*	*98%*	*98%*	*100%*	**99%**
Valley Hospital							
# patients	164	179	26	165	104	50	**688**
% receiving	*99%*	*98%*	*100%*	*99%*	*95%*	*98%*	**98%**
St Francis Medical Center							
# patients	75	128	39	119	74	33	**468**
% receiving	*100%*	*99%*	*100%*	*99%*	*97%*	*97%*	**99%**
Our Lady of Lourdes Medical Center							
# patients	135	144	59	123	75	49	**585**
% receiving	*100%*	*97%*	*100%*	*98%*	*95%*	*96%*	**98%**
Somerset Medical Center							
# patients	160	120	36	139	89	49	**593**
% receiving	*98%*	*96%*	*100%*	*99%*	*98%*	*100%*	**98%**
Overlook Hospital							
# patients	197	234	61	184	150	66	**892**
% receiving	*99%*	*97%*	*100%*	*98%*	*91%*	*97%*	**97%**
Atlanticare Regional Medical Center							
# patients	267	419	148	331	207	86	**1458**
% receiving	*100%*	*99%*	*100%*	*98%*	*97%*	*100%*	**99%**

(continued)

Table 6-9 (continued)
Year 3 hospital process of care measures: pneumonia, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Pneumococcal vaccination	Blood cultures performed in the emergency department prior to initial antibiotic received in hospital	Adult smoking cessation advice/counseling	Initial antibiotic received within 6 hours of hospital arrival	Initial antibiotic selection for CAP in immunocompetent patient	Influenza vaccination	Pneumonia composite score
Jersey Shore University Medical Center							
# patients	155	167	60	145	110	54	**691**
% receiving	*93%*	*99%*	*100%*	*96%*	*95%*	*93%*	**96%**
Monmouth Medical Center							
# patients	112	185	44	145	113	35	**634**
% receiving	*97%*	*99%*	*100%*	*100%*	*97%*	*94%*	**98%**
JFK Medical Center							
# patients	436	574	112	474	283	142	**2021**
% receiving	*97%*	*99%*	*100%*	*99%*	*97%*	*93%*	**98%**
Centrastate Medical Center							
# patients	370	382	71	327	179	110	**1439**
% receiving	*99%*	*95%*	*100%*	*98%*	*97%*	*99%*	**98%**
Comparison Hospitals							
# patients	4692	5524	1600	4945	3060	1608	**21429**
% receiving	99%	99%	100%	98%	98%	98%	**98%**

NOTE: The composite score is calculated by summing the numerator and denominator for each measure in a topic and then dividing numerator by denominator to get the rate.

SOURCE: 2011Q3 - 2012Q2 Inpatient Quality Reporting (formerly Reporting Hospital Quality Data for Annual Payment Update) data

Table 6-10
Year 3 hospital process of care measures: surgical care improvement project, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Prophylactic Antibiotic Received Within 1 Hour Prior to Surgical Incision	Prophylactic Antibiotic Selection for Surgical Patients	Prophylactic Antibiotics Discontinued Within 24 Hours After Surgery End Time	Surgery Patients with Recommended Venous Thromboembolism Prophylaxis Ordered	Surgery Patients Who Received Appropriate Venous Thromboembolism Prophylaxis Within 24 Hours Prior to Surgery to 24 Hours After Surgery	Cardiac Surgery Patients With Controlled 6 A.M. Postoperative Blood Glucose	Surgery Patients with Appropriate Hair Removal	Surgery Patients on Beta-Blocker Therapy Prior to Arrival Who Received a Beta-Blocker During the Perioperative Period	SCIP Composite Score
Hunterdon Medical Center									
# patients	225	228	225	279	279	0	363	102	**1701**
% receiving	*97%*	*98%*	*100%*	*93%*	*92%*	*N/A*	*100%*	*94%*	***97%***
Holy Name Hospital									
# patients	292	294	277	355	355	0	454	134	**2161**
% receiving	*99%*	*99%*	*97%*	*99%*	*99%*	*N/A*	*100%*	*100%*	***99%***
Valley Hospital									
# patients	540	547	524	424	424	167	794	299	**3719**
% receiving	*99%*	*99%*	*97%*	*98%*	*98%*	*97%*	*100%*	*94%*	***98%***
St Francis Medical Center									
# patients	128	131	117	139	139	81	251	107	**1093**
% receiving	*99%*	*100%*	*99%*	*97%*	*97%*	*89%*	*100%*	*100%*	***98%***
Our Lady of Lourdes Medical Center									
# patients	313	319	301	228	228	169	516	237	**2311**
% receiving	*99%*	*98%*	*98%*	*99%*	*98%*	*99%*	*100%*	*98%*	***99%***
Somerset Medical Center									
# patients	280	284	279	328	328	0	497	168	**2164**
% receiving	*97%*	*99%*	*100%*	*98%*	*97%*	*N/A*	*99%*	*97%*	***98%***
Overlook Hospital									
# patients	349	359	344	383	382	0	545	145	**2507**
% receiving	*100%*	*98%*	*99%*	*99%*	*99%*	*N/A*	*100%*	*99%*	***99%***

(continued)

Table 6-10 (continued)
Year 3 hospital process of care measures: surgical care improvement project, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Prophylactic Antibiotic Received Within 1 Hour Prior to Surgical Incision	Prophylactic Antibiotic Selection for Surgical Patients	Prophylactic Antibiotics Discontinued Within 24 Hours After Surgery End Time	Surgery Patients with Recommended Venous Thromboembolism Prophylaxis Ordered	Surgery Patients Who Received Appropriate Venous Thromboembolism Prophylaxis Within 24 Hours Prior to Surgery to 24 Hours After Surgery	Cardiac Surgery Patients With Controlled 6 A.M. Postoperative Blood Glucose	Surgery Patients with Appropriate Hair Removal	Surgery Patients on Beta-Blocker Therapy Prior to Arrival Who Received a Beta-Blocker During the Perioperative Period	SCIP Composite Score
Atlanticare Regional Medical Center									
# patients	526	548	500	662	662	148	1059	357	**4462**
% receiving	*98%*	*97%*	*97%*	*99%*	*97%*	*97%*	*100%*	*97%*	***98%***
Jersey Shore University Medical Center									
# patients	820	842	791	500	500	405	1133	470	**5461**
% receiving	*99%*	*99%*	*97%*	*99%*	*97%*	*99%*	*100%*	*98%*	***99%***
Monmouth Medical Center									
# patients	320	319	310	371	371	0	505	102	**2298**
% receiving	*100%*	*98%*	*99%*	*100%*	*98%*	*N/A*	*100%*	*98%*	***99%***
JFK Medical Center									
# patients	758	760	741	750	749	0	981	255	**4994**
% receiving	*98%*	*99%*	*96%*	*98%*	*97%*	*N/A*	*98%*	*92%*	***97%***
Centrastate Medical Center									
# patients	312	312	305	387	387	0	582	173	**2458**
% receiving	*98%*	*98%*	*96%*	*98%*	*98%*	*N/A*	*100%*	*95%*	***98%***
Comparison Hospitals									
# patients	7175	7219	6947	8023	8019	340	11330	3371	**52424**
% receiving	*99%*	*99%*	*98%*	*98%*	*98%*	*96%*	*100%*	*97%*	***99%***

NOTE: The composite score is calculated by summing the numerator and denominator for each measure in a topic and then dividing numerator by denominator to get the rate.

SOURCE: 2011 Quarterly Inpatient Quality Reporting (IQR) data.

6.4 Multivariate Results

Claims Based Measures: We present the results of a 2D analysis of the following dependent variables: 30-day mortality, 90-day mortality, 90-day readmissions, IQI numerator (mortality), and PSI numerator (event). Each of these is a binary variable equal to one if the patient met the criteria in question (i.e., if the patient died within 30 days of admission). As outlined above, we model logistic regressions to estimate the impact of the demonstration on each of these outcome measures. The sample size for each measure is indicated below.

We used two measures that are based on the AHRQ Quality Indicators measures presented above. The first, IQI numerator (mortality), is equal to one if the patient is eligible for inclusion in the numerator of at least one of the Inpatient Quality Indicators (IQI) measures described above. As described above, the IQIs are mortality rates for selected conditions: acute myocardial infarction (AMI), congestive heart failure (CHF), stroke, gastrointestinal (GI) hemorrhage, hip fracture, or pneumonia. The denominator consists of all patients treated for these conditions and who meet additional exclusion criteria imposed by the AHRQ methodology. A patient who died while being treated for any of these conditions will be counted in the numerator for the overall IQI measure. Aggregating to this level addresses the fact that the individual denominators for any single IQI measure may be too small.

Similarly, for the Patient Safety Indicators (PSIs) we calculated one overall measure to indicate whether a patient experienced any of the 13 preventable complications captured by the PSIs we calculate above. For example, the PSI numerator will be equal to one if a patient who meets all exclusion criteria develops a pressure ulcer while in the hospital. Aggregating to this level addresses the fact that the individual numerators for any single PSI measure may be small.

One focus of the PHC Demonstration was to incentivize hospitals and physicians to collaborate in an effort to generate internal cost savings while maintaining (or improving) quality of care. Strategies employed by the hospital were not to lead to declines in hospital quality. In this analysis, a decrease in hospital quality appears as a positive coefficient (i.e., each of the measures are negative events). We calculated the difference-in-differences (e.g., 30-day mortality) for each of the quality measures as specified in Section 6.2. We tested the significance of our estimates by constructing 95 percent confidence intervals using the standard errors calculated from a simple OLS regression model.

We found no statistically significant impact of the demonstration on any of the five quality measures (***Table 6-11 and 6-12***). The full logistic regression models which these results are based upon are presented in ***Appendix Tables 6-21 and 6-22.*** Though insignificant, our results indicate some amount of decline in 30-day mortality, 90 day readmissions and mortality for selected conditions (IQI) relative to the change in the comparison hospitals. In the other direction, the demonstration hospitals performance declined relative to the comparison hospitals in 90-day mortality and adverse events (PSI). However, the changes between the performance years and the base year are not statistically significant and of very small magnitude. We also examined the year specific effects for each of the five quality indicators. The demonstration hospitals declined against the comparison hospitals in year 1 for the probability of a 90 day readmissions, but then made gains in year 2 and 3.

Table 6-11
Estimates of difference in differences for 30/90 day mortality, and 90 day readmission rate
(based on regression results from Appendix Tables 6-21 and 6-22)

Demonstration site or comparison hospitals	Mean probability of 30 day mortality (N = 404,981)				Mean probability of 90 day mortality (N = 404,981)				Mean probability of 90 day readmission (N = 404,981)			
	Base period	Perform-ance period	Perform-ance minus base period	Difference in Difference	Base period	Perform-ance period	Perform-ance minus base period	Difference in Difference	Base period	Perform-ance period	Perform-ance minus base period	Difference in Difference
Py1												
Demonstration Hospitals	4.19%	4.43%	0.24%	-0.15%	6.96%	7.40%	0.44%	0.04%	28.43%	27.79%	-0.64%	0.11%
Comparison Hospitals	4.13%	4.52%	0.39%	—	6.93%	7.33%	0.41%	—	28.08%	27.68%	-0.40%	—
Py2												
Demonstration Hospitals	4.19%	5.04%	0.85%	0.01%	6.96%	8.09%	1.13%	0.01%	28.43%	28.04%	-0.39%	-0.72%
Comparison Hospitals	4.13%	4.98%	0.85%	—	6.93%	8.05%	1.12%	—	28.08%	28.41%	0.33%	—
Py3												
Demonstration Hospitals	4.19%	5.42%	1.23%	0.04%	6.96%	8.56%	1.60%	0.24%	28.43%	27.85%	-0.58%	-0.37%
Comparison Hospitals	4.13%	5.31%	1.18%	—	6.93%	8.29%	1.36%	—	28.08%	27.87%	-0.21%	—
Pooled Performance Years												
Demonstration Hospitals	4.23%	4.91%	0.68%	-0.07%	7.00%	7.94%	0.94%	0.05%	28.53%	27.76%	-0.77%	-0.49%
Comparison Hospitals	4.15%	4.90%	0.75%	—	6.97%	7.86%	0.90%	—	28.28%	28.00%	-0.28%	—

NOTES:

All estimates of the difference in differences are not significantly different than zero.

Pooled base year predictions vary slightly from the individual years due to the different set of regressors in the logistic regression model.

SOURCE: RTI Processing of Medicare Claims

Table 6-12
Estimates of difference in differences for mortality rate (IQI) and rate of adverse events (PSI)
(based on regression results from Appendix Tables 6-21 and 6-22)

Demonstration site or comparison hospitals	Mean probability of mortality IQI (N = 72,150)				Mean probability of adverse event PSI (N = 321,683)			
	Base period	Performance period	Performance minus base period	Difference in Difference	Base period	Performance period	Performance minus base period	Difference in Difference
Py1								
Demonstration Hospitals	5.54%	5.25%	-0.29%	-0.60%	2.23%	1.03%	-1.21%	0.20%
Comparison Hospitals	4.85%	5.15%	0.30%	—	2.28%	0.88%	-1.40%	—
Py2								
Demonstration Hospitals	5.54%	5.98%	0.44%	-0.08%	2.23%	1.02%	-1.22%	0.08%
Comparison Hospitals	4.85%	5.38%	0.53%	—	2.28%	0.99%	-1.29%	—
Py3								
Demonstration Hospitals	5.54%	5.65%	0.11%	-0.94%	2.23%	1.05%	-1.19%	0.13%
Comparison Hospitals	4.85%	5.91%	1.06%	—	2.28%	0.96%	-1.32%	—
Pooled Performance Years								
Demonstration Hospitals	5.60%	5.51%	-0.09%	-0.63%	1.86%	1.18%	-0.69%	0.08%
Comparison Hospitals	4.95%	5.50%	0.54%	—	1.78%	1.02%	-0.77%	—

NOTES:

All estimates of the difference in differences are not significantly different than zero.

Pooled base year predictions vary slightly from the individual years due to the different set of regressors in the logistic regression model.

SOURCE: RTI Processing of Medicare Claims

Medical Record Based Measures: We present the results of a simple 2D analysis of the four IQR composite scores in ***Table 6-13***. This analysis does not control for other factors (as was possible in the previous 2D models) because of the small sample sizes. The comparison hospitals are not shown here because they were used to calculate the difference-in-differences measure. The differences presented in the table represent the difference across time and the difference between each hospital and the comparison group. Across each of the composite scores the differences are small, generally within +/-2 percent although in some cases as much as +/-10 percent. There tends to be less variation across the demonstration hospitals in the AMI composite, relative to the other composite measures, which have more variation. Because these estimates are based on a single observation for each hospital in each period, we cannot test the statistical significance of these estimates.

Table 6-13
Difference-in-differences (2D) estimates of medical record-based measures

Hospital	AMI Composite Score	HF Composite Score	Pneumonia Composite Score	SCIP Composite Score
Hunterdon Medical Center	-2%	-7%	-5%	-3%
Holy Name Hospital	-2%	-6%	-4%	-4%
Valley Hospital	-1%	3%	-2%	-3%
St Francis Medical Center	0%	-1%	-2%	0%
Our Lady of Lourdes Medical Center	-1%	-4%	-3%	-4%
Somerset Medical Center	-2%	-5%	0%	0%
Overlook Hospital	4%	-1%	-3%	-3%
Atlanticare Regional Medical Center	-1%	-5%	-4%	-5%
Jersey Shore University Medical Center	-2%	-7%	-3%	-3%
Monmouth Medical Center	0%	-6%	-1%	-3%
JFK Medical Center	2%	5%	2%	1%
Centrastate Medical Center	-1%	4%	1%	1%

NOTE: The composite score is calculated by summing the numerator and denominator for each measure in a topic and then dividing numerator by denominator to get the rate.

SOURCE: 2007Q4 - 2008Q3 and 2011Q4 - 2012Q3 Inpatient Quality Reporting (formerly Reporting Hospital Quality Data for Annual Payment Update) data

6.5 Discussion

Our results indicate small, and where we are able to test, statistically insignificant impacts of the demonstration on the quality indicators measured above. This is likely the result of convergence in improved quality across hospitals given the emphasis on quality improvement over the past two decades. Overall, it appears that the demonstration did not have any significant or lasting unintended negative effects on the quality of care delivered at the demonstration hospitals. However, it also appears that the PHC demonstration did not lead to any significant

improvements in quality of care relative to the secular trends we observed among the comparison hospitals. This may be viewed as a disappointment as PHC demonstration hospitals tended to describe their gainsharing interventions in terms of both internal savings *and* quality improvement.

SECTION 7
PATIENT SATISFACTION

The previous section presented quality measures derived from inpatient claims and medical records data. In addition to quality measures that focus on outcomes or processes of care, quality can also be interpreted more broadly to include patient experience. In this section we present patient satisfaction measures from beneficiary surveys. The measures below represent comparisons of the third performance year of the demonstration. The gainsharing initiatives implemented under the Physician Hospital Collaboration (PHC) demonstration were intended to be transparent to patients, and evidence of decreased levels of patient satisfaction in demonstration hospitals relative to the comparison group during the intervention years may indicate that this goal was not accomplished.

7.1 Data Sources, Measures and Methods

In addition to measuring the outcomes of how care is delivered in the hospital setting, it is also of interest to evaluate the patient experience in order to gain a more complete understanding of hospital quality. Patients are consumers of health care and may have concerns in addition to those addressed by measures of outcomes and processes of care. To address this aspect of quality of care, we analyzed patient experience measures for 10 hospital related topics.

Endorsed by the National Quality Forum in 2005, the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey was developed through a partnership between CMS and the Agency for Healthcare Research and Quality (AHRQ). HCAHPS data have been collected since 2006 and were first publicly reported in 2008. The survey is administered to a random sample of adult patients across medical conditions throughout each month of the year. It contains 27 questions that result in 10 measures: 6 summary measures, 2 individual measures, and 2 global measures. Although the data are collected by vendors hired by reporting hospitals, CMS provides quality oversight that includes inspecting survey administration procedures and analyzing submitted data. Four methods are available to hospitals for collecting data; CMS adjusts for this when standardizing scores for comparison across hospitals.

Survey-based quality measures provide details about hospital quality that cannot be garnered from claims or medical records data, but these measures do have limitations. The data are drawn from a random sample of at least 300 patients per four rolling quarters, but this methodology still has the potential for bias. Although strict standards are upheld to ensure the quality of data and minimize the impact of bias, these methods may not sufficiently eliminate all bias from the data. The HCAHPS data are also not specific to particular service lines. Any relationship between the demonstration and these quality measures is correlated, but not causal, and must be analyzed with that caveat.

7.2 Descriptive Results

The HCAHPS survey contains 27 questions that result in 10 survey-based quality indicator measures. ***Tables 7-1 through 7-10*** present comparisons of the third year after implementation (Q1 2011- Q3 2012) and the base year (2008). For the HCAHPS results, we examined the data one quarter after the period of interest due to the lag between hospitalization

and when a patient would be surveyed. ***Figures 7-1 through 7-10*** present comparisons of the base year and all 3 performance years. The measures are grouped into three broad categories as follows:

- Summary measures
  - Communication with nurses
  - Communication with doctors
  - Responsiveness of hospital staff
  - Pain management
  - Communication about medication
  - Discharge information
- Individual measures
  - Cleanliness of hospital environment
  - Quietness of hospital environment
- Global measures
  - Overall rating of hospital
  - Willingness to recommend hospital

With the exception of the discharge information measure, which requires two yes or no questions, each measure uses at least three questions to develop the rating. We used HCAHPS data downloaded from the Hospital Compare Web site. Data presented below are from the September 2009 and July 2011, 2012 and 2013 releases, which report HCAHPS data collected from calendar year 2008 and, October 2009-September 2010, October 2010-September 2011, and October 2011- September 2012, respectively. Ratings for the comparison group were calculated as a simple average across all of the comparison hospitals. Reporting of HCAHPS data is voluntary for the comparison hospitals, but the PHC demonstration sites were required, as a condition of participation, to report HCAHPS data.

Communication with nurses: Patients were asked how often nurses communicated well. The HCAHPS results for this question are presented in ***Table 7-1*** for the intervention hospitals and the comparison group. Patients can respond to the question with one of three answers: always; usually; or sometimes/never. We present the aggregate of "always" and "usually" responses. Results for both periods are quite similar across the 12 demonstration hospitals and the comparison group, ranging 5 percentage points in 2008 and 3 percentage points in PY3 for the responses "always" or "usually."

Patients surveyed about the intervention hospitals indicated that nurses always or usually communicated well, ranging from 91 percent (Atlanticare Regional Medical Center and JFK Medical Center) to 96 percent (Valley Hospital) of the time in 2008. Among the intervention hospitals, patients treated in PY3 responded that nurses always or usually communicated well between 93 percent (Holy Name Hospital, St. Francis Medical Center, and JFK Medical Center) and 97 percent (Hunterdon and Valley Hospital) of the time. Among the comparison hospitals, 93 percent of patients responded that nurses always or usually communicated well in 2008 and 94 percent responded always or usually in PY3. The percentage change between the baseline and PY3 ranged from 1 to 4 percent.

Table 7-1
Communication with nurses

How often did nurses communicate well with patients?	Base Year Always or Usually, %	Year 3 Always or Usually, %	Percentage Change
Hunterdon Medical Center	95%	97%	2%
Holy Name Hospital	92%	93%	1%
Valley Hospital	96%	97%	1%
St. Francis Medical Center	93%	93%	0%
Our Lady of Lourdes Medical Center	93%	94%	1%
Somerset Medical Center	94%	96%	2%
Overlook Hospital	93%	95%	2%
Atlanticare Regional Medical Center	91%	94%	3%
Jersey Shore University Medical Center	93%	95%	2%
Monmouth Medical Center	92%	96%	4%
JFK Medical Center	91%	93%	2%
Centrastate Medical Center	94%	96%	2%
Comparison Hospitals	93%	94%	1%

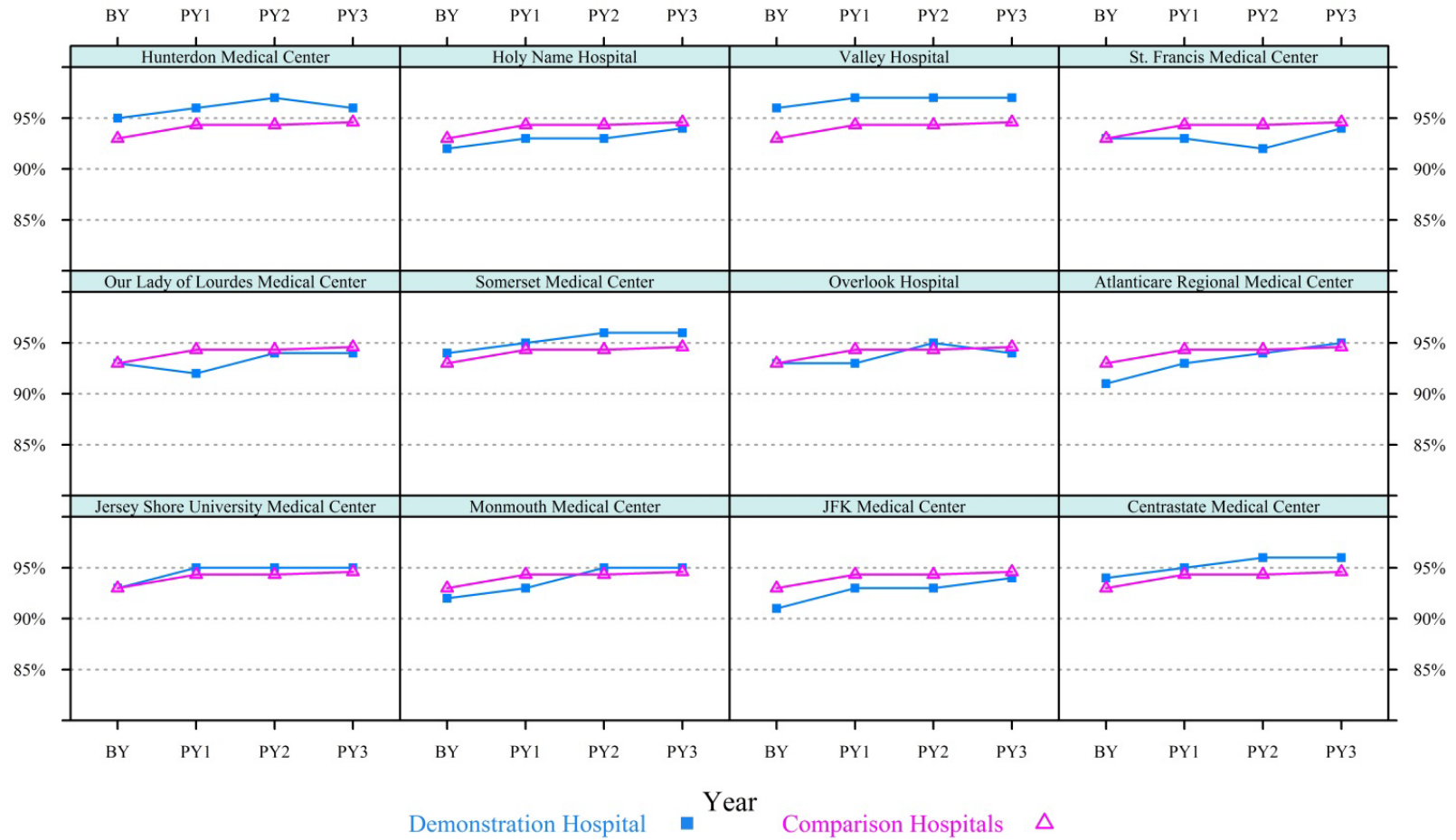
SOURCE: September 2009 and July 2013 Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) release.

Figure 7-1 illustrates the changes in positive responses (always or usually) from the base period through the demonstration for each of the 12 hospitals. Four hospitals (Hunterdon Medical Center, St. Francis Medical Center, Our Lady of Lourdes Medical Center, and Overlook Hospital) had their scores decrease at some point during the demonstration period. All demonstration hospitals experienced an overall increase in positive response from the base year to PY3. The comparison hospitals increased from the base year to PY1, slightly declined in PY2 and then increased in PY3. The majority of demonstration hospitals have results that are similar to the comparison hospitals. Valley hospital, Somerset Medical Center, Centrastate and Hunterdon Medical Center were the only demonstration hospitals to have a higher percent of positive responses than the comparison hospitals for the base year and all three demonstration years. JFK Medical center and Holy Name Hospital were the only hospitals to have a lower percentage of positive response than the comparison hospitals for the base year and all demonstration years.

Communication with doctors: ***Table 7-2*** presents patient responses to the question about how well doctors communicated with patients. Patient responses varied little between the intervention hospitals and the comparison group, with the responses "always" or "usually" within a range of 4 percentage points in both periods. Patients treated at the comparison group hospitals reported that doctors always or usually communicated well 94 percent of the time in the base year and 95 percent of the time in PY3.

In 2008 patient responses indicated that doctors always or usually communicated well between 92 percent (Our Lady of Lourdes Medical Center and Atlanticare Regional Medical Center) and 96 percent (Valley Hospital and Centrastate Medical Center) of the time. Responses in PY3 from patients treated at the intervention hospital ranged from 92 percent (Our Lady of Lourdes Medical) to 96 percent (Hunterdon, Holy Name, Valley, Somerset and Overlook Hospitals). Among the intervention hospitals the percentage change from 2008 to 2011 ranged between -1 percent to 3 percent. We observed no change among the comparison hospitals for increased their communication with doctors between the base year and PY3.

Figure 7-1
Communication with nurses



SOURCE: 2008-Q3 (2012) Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS).

Table 7-2
Communication with doctors

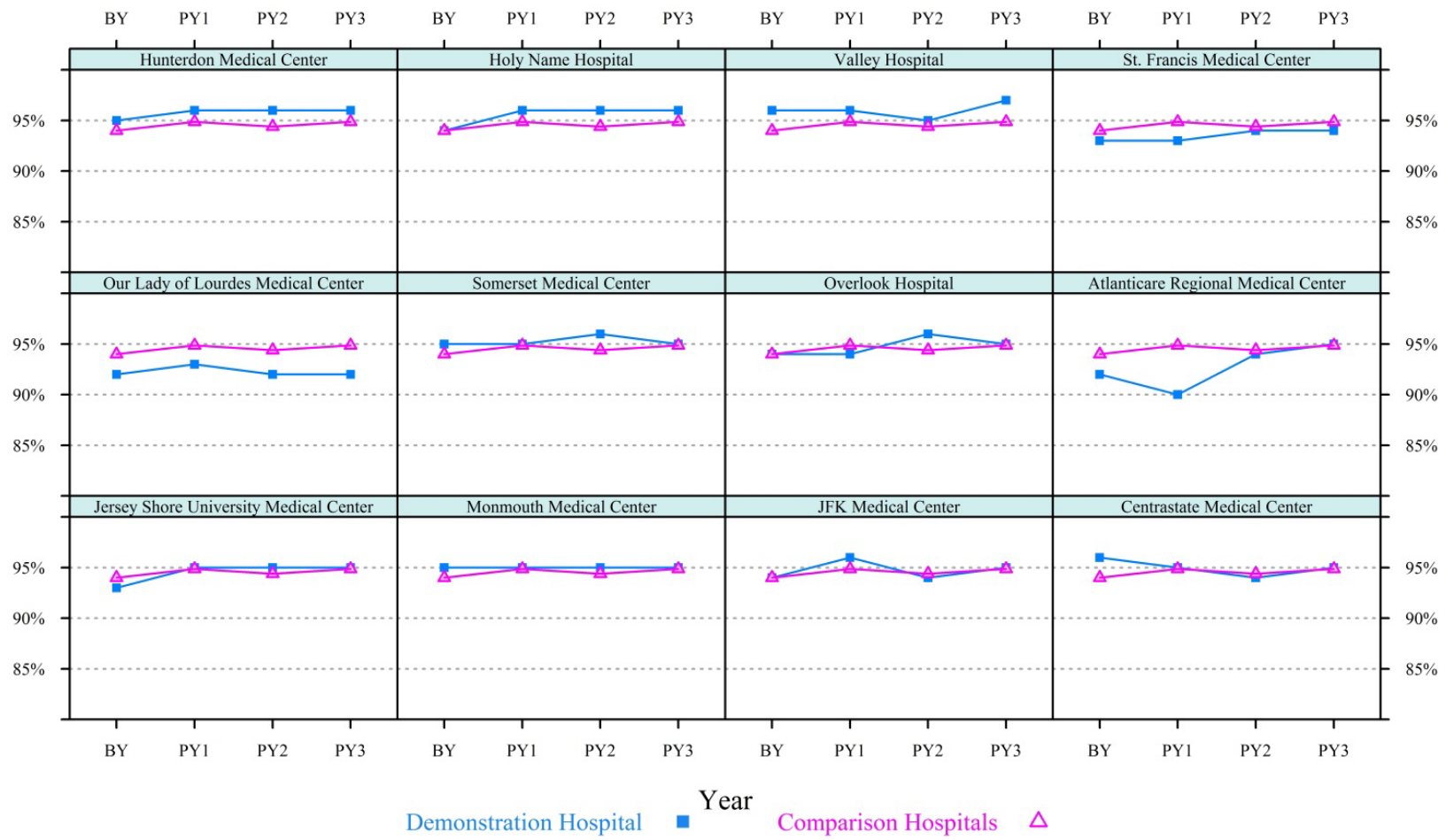
How often did doctors communicate well with patients?	Base Year Always or Usually, %	Year 3 Always or Usually, %	Percentage Change
Hunterdon Medical Center	95%	96%	1%
Holy Name Hospital	94%	96%	2%
Valley Hospital	96%	96%	0%
St. Francis Medical Center	93%	95%	2%
Our Lady of Lourdes Medical Center	92%	92%	0%
Somerset Medical Center	95%	96%	1%
Overlook Hospital	94%	96%	2%
Atlanticare Regional Medical Center	92%	94%	2%
Jersey Shore University Medical Center	93%	95%	2%
Monmouth Medical Center	95%	95%	0%
JFK Medical Center	94%	95%	1%
Centrastate Medical Center	96%	94%	-2%
Comparison Hospitals	94%	94%	0%

SOURCE: September 2009 and July 2013 Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) release.

Figure 7-2 shows the change in positive responses from the base year to PY3. None of the demonstration hospitals steadily increased throughout the demonstration period. The comparison hospitals' communication with doctors increased from the base year to PY1, declined in PY2 and increased again in PY3. The magnitude of the changes is negligible as all hospitals were near 95 percent positive ratings in all years. Two of the lower performing hospitals were Our Lady of Lourdes Medical Center and Atlanticare Regional Medical Center. Both had ratings that were below 95 percent, but above 90 percent in all four years. Hunterdon Medical Center and Valley Hospital had consistently higher ratings than the comparison hospitals in all four years.

Responsiveness of hospital staff: Patient respondents were asked how often they received help quickly from hospital staff. Results for patient responses to this question are presented in ***Table 7-3***. Patient responses varied somewhat, with a range of 10 percentage points in 2008 and 11 percentage points in PY3 for the responses "always" and "usually," among the intervention hospitals and the comparison hospitals as a group. At the comparison hospitals, 86 percent of patients surveyed about stays in the base year and 86 percent again in the third year of the demonstration indicated that hospital staff always or usually responded with help quickly.

Figure 7-2
Communication with doctors



SOURCE: 2008-Q3 (2012) Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS).

Table 7-3
Responsiveness of hospital staff

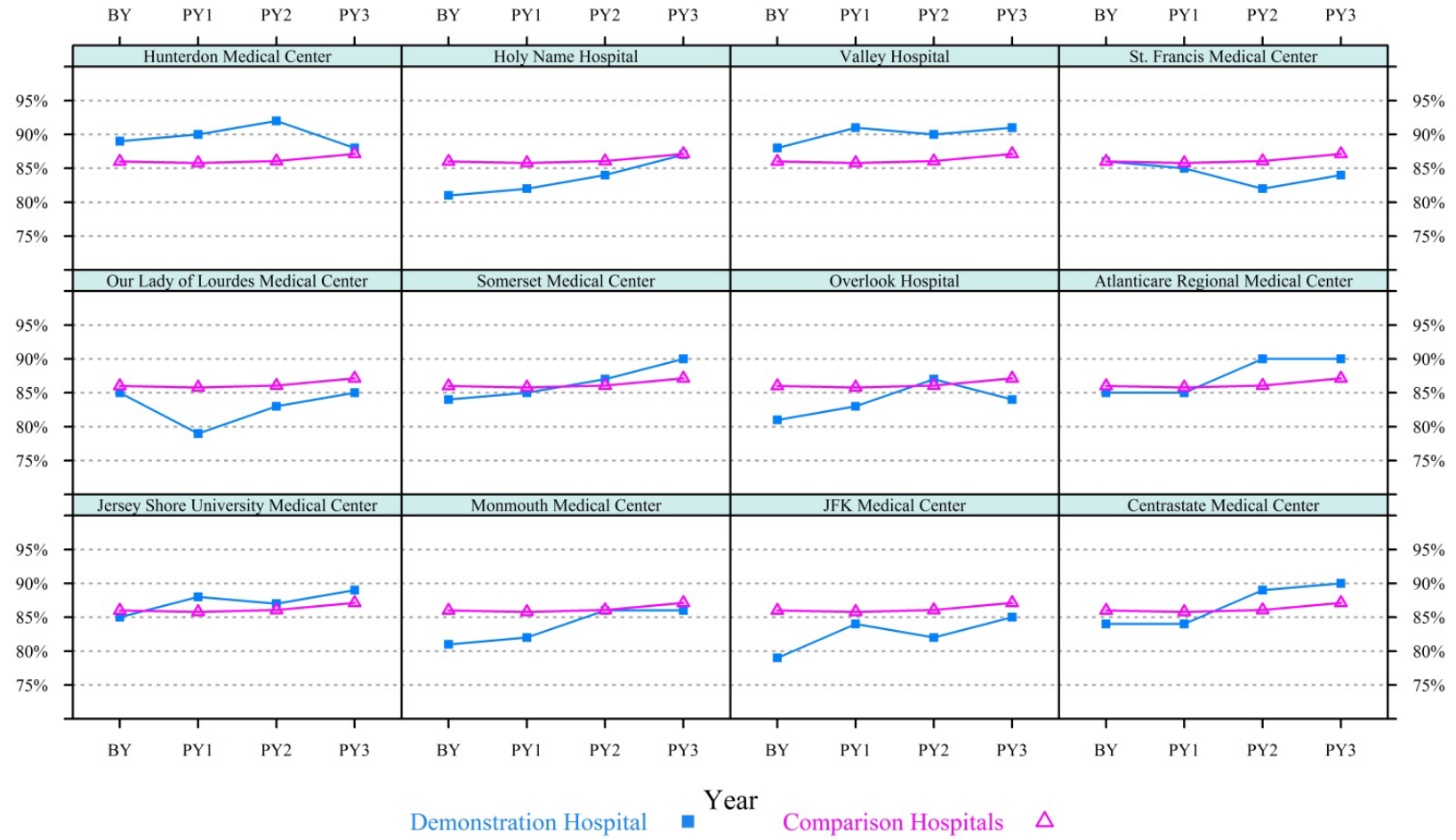
How often did patients receive help quickly from hospital staff?	Base Year Always or Usually, %	Year 3 Always or Usually, %	Percentage Change
Hunterdon Medical Center	89%	90%	1%
Holy Name Hospital	81%	84%	4%
Valley Hospital	88%	90%	2%
St. Francis Medical Center	86%	79%	-8%
Our Lady of Lourdes Medical Center	85%	84%	-1%
Somerset Medical Center	84%	89%	6%
Overlook Hospital	81%	86%	6%
Atlanticare Regional Medical Center	85%	89%	5%
Jersey Shore University Medical Center	85%	88%	4%
Monmouth Medical Center	81%	86%	6%
JFK Medical Center	79%	82%	4%
Centrastate Medical Center	84%	90%	7%
Comparison Hospitals	86%	86%	0%

SOURCE: September 2009 and July 2013 Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) release.

Patients treated at the demonstration hospitals indicated that hospital staff always or usually responded quickly between 79 percent (JFK Medical Center) and 89 percent (Hunterdon Medical Center) in the base period and 79 percent (St. Francis Medical Center) and 90 percent (Hunterdon, Valley and Centrastate Hospitals) of the time during the third implementation year. Among the intervention hospitals the percentage change from base year to PY3 ranged from a 8 percent decline (St. Francis Medical Center) to a 7 percent increase (Centrastate Medical Center).

Figure 7-3 shows the change in positive responses from the base year to PY3. Two hospitals, Our Lady of Lourdes Medical Center and JFK Medical Center, had lower ratings than the comparison group in all four periods. The responses at the comparison hospitals remained steady from the base year until PY2 and then increased in PY3. Two hospitals (Hunterdon Medical Center, Valley Hospital) had a greater percent of positive responses than the comparison hospitals in the base year and implementation years. Overall, the comparison hospitals' staff were responsive about 86 percent of the time.

Figure 7-3
Responsiveness of hospital staff



SOURCE: 2008-Q3 (2012) Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS).

Pain management: The HCAHPS survey asked patients about how well their pain was controlled during their hospital stay. The results for this question are presented in ***Table 7-4***. Patient responses to this question varied little in PY3, with the exception of a lower rating for Our Lady of Lourdes which had a lower relative rating. There was a much wider range of responses (21 percentage points) during 2008, with responses ranging from 74 percent (JFK Medical Center) to 95 percent (Valley Hospital). The responses in PY3 ranged between 89 percent (Our Lady of Lourdes Medical Center) and 95 percent (Valley Hospital). At the comparison hospitals, 91 percent of patients in the base year and 92 percent in PY3 indicated that their pain was always or usually well controlled. The percentage change between the two periods ranged from -3 percent (Our Lady of Lourdes Medical Center) to and improvement of 22 percent (JFK Medical Center).

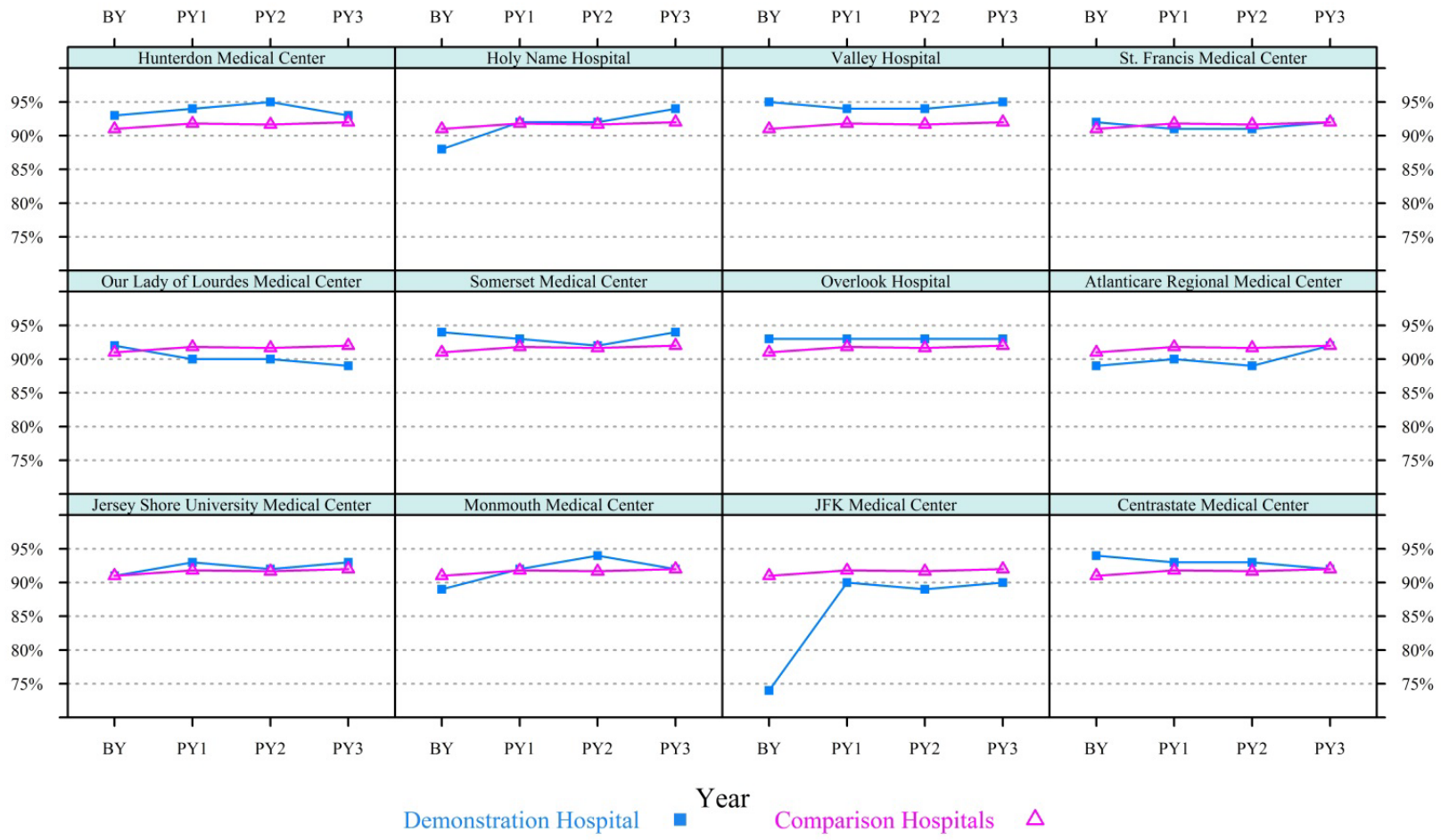
Table 7-4
Pain management

How often was patients' pain well controlled?	Base Year Always or Usually, %	Year 3 Always or Usually, %	Percentage Change
Hunterdon Medical Center	93%	93%	0%
Holy Name Hospital	88%	94%	7%
Valley Hospital	95%	95%	0%
St. Francis Medical Center	92%	92%	0%
Our Lady of Lourdes Medical Center	92%	89%	-3%
Somerset Medical Center	94%	94%	0%
Overlook Hospital	93%	93%	0%
Atlanticare Regional Medical Center	89%	92%	3%
Jersey Shore University Medical Center	91%	93%	2%
Monmouth Medical Center	89%	92%	3%
JFK Medical Center	74%	90%	22%
Centrastate Medical Center	94%	92%	-2%
Comparison Hospitals	91%	92%	1%

SOURCE: September 2009 and July 2013 Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) release.

The change in positive responses to how often patients' pain was well controlled is shown in ***Figure 7-4***. JFK Medical Center had a large increase in positive responses between the base year and the first performance year followed by a slight increase from the first to second performance years and a small decrease in responses from the second to the third performance years. The positive responses about pain management at the comparison hospitals remained steady across the four time periods at approximately 91 percent. Relative to the comparison hospitals, three hospitals (Hunterdon Medical Center, Valley Hospital, and Overlook Hospital) always had a higher percent of positive responses from patients about pain management. JFK Medical Center was the only hospital that fell below the comparison hospitals in all four time periods.

Figure 7-4
Pain management



SOURCE: 2008-Q3 (2012) Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS).

Communication about medication: Table 7-5 presents patient responses to a question about hospital staff explaining medication before giving it to patients. Results for this question vary to some extent among the intervention hospitals in both periods. Of patients surveyed about care provided in 2008, 74 percent of patients at the comparison hospitals reported that staff always or usually explained about medication prior to administration. In the demonstration hospitals responses ranged 9 percentage points, from 70 percent (Holy Name Hospital) to 79 percent (Centrastate Medical Center). Responses for PY3 indicate that 76 percent of patients treated at the comparison hospitals in both periods were always or usually told about medications prior to administration. Results for the intervention hospitals have a range of 7 percentage points, from 75 percent (Our Lady of Lourdes) to 81 percent (Monmouth). The percentage change in responses of "always" or "usually" ranged from a 1 percent decline (Our Lady of Lourdes) to a 10 percent improvement (Holy Name Hospital).

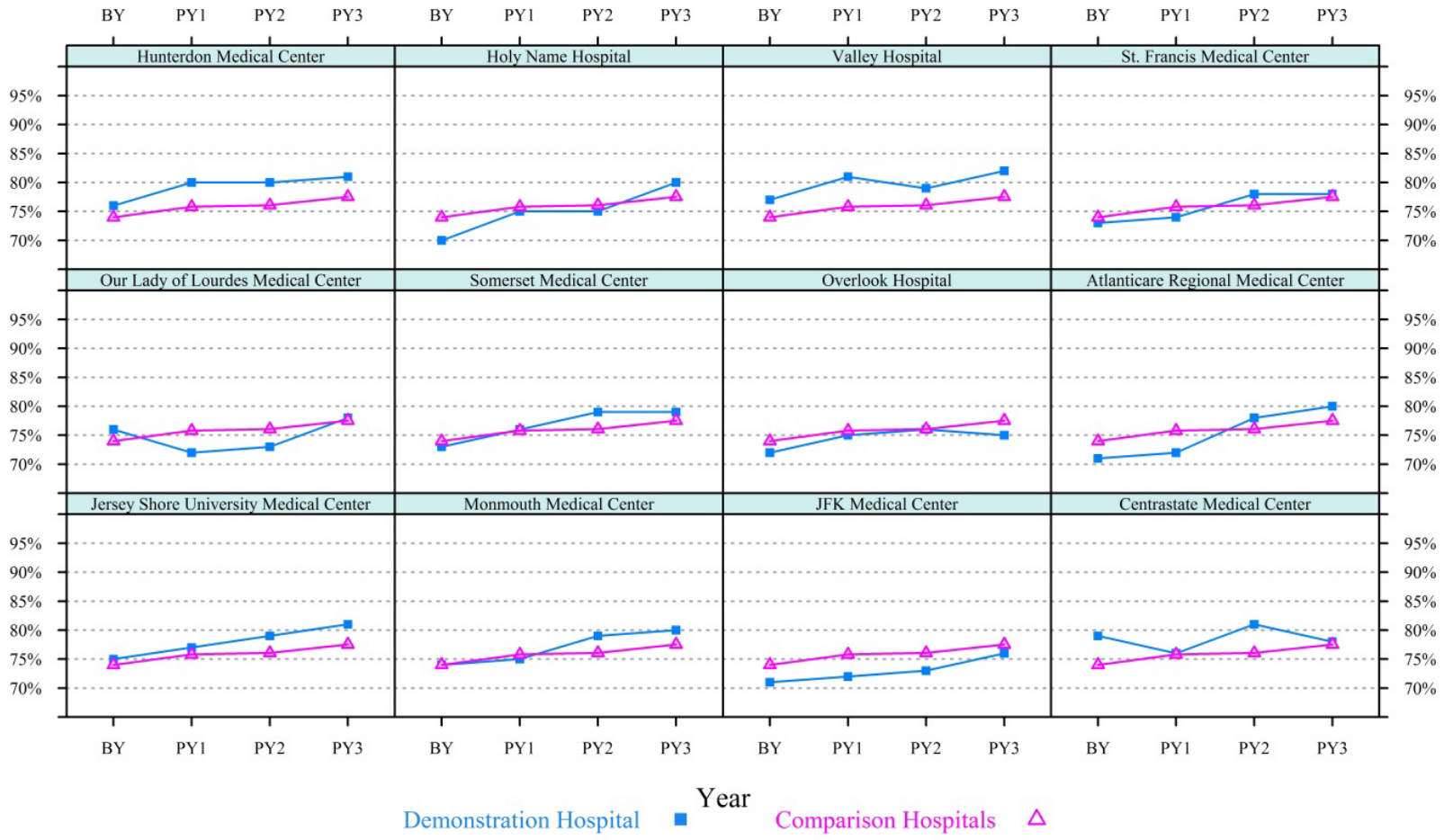
Table 7-5
Communication about medication

How often did staff explain about medicines before giving them to patients?	Base Year Always or Usually, %	Year 3 Always or Usually, %	Percentage Change
Hunterdon Medical Center	76%	80%	5%
Holy Name Hospital	70%	77%	10%
Valley Hospital	77%	80%	4%
St. Francis Medical Center	73%	77%	5%
Our Lady of Lourdes Medical Center	76%	75%	-1%
Somerset Medical Center	73%	79%	8%
Overlook Hospital	72%	74%	3%
Atlanticare Regional Medical Center	71%	77%	8%
Jersey Shore University Medical Center	75%	79%	5%
Monmouth Medical Center	74%	81%	9%
JFK Medical Center	71%	74%	4%
Centrastate Medical Center	79%	79%	0%
Comparison Hospitals	74%	76%	3%

SOURCE: September 2009 and July 2013 Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) release.

Figure 7-5 illustrates the trend in positive responses to the questions how often did staff explain about medication before giving them to patients for the demonstration and comparison hospitals. The comparison hospitals increased consistently from 74 percent in the base year to 76 percent in PY3. Hunterdon Medical Center and Valley Hospital consistently outperformed the comparison hospitals in all four periods. JFK Medical Center was the only hospital that performed below the comparison hospitals in all four periods. None of the hospitals was below 70 percent and the highest score in all four years was 81 percent.

Figure 7-5
Communication about medication



SOURCE: 2008-Q3 (2012) Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS).

Discharge information: Patients were asked whether they were given information about what was required to continue their recovery at home. ***Table 7-6*** presents patient responses to this question, which varied somewhat among the intervention hospitals and group of comparison hospitals. Seventy-seven percent of patients surveyed at the comparison hospitals were given this information prior to discharge in the base year and 79 percent were given this information in year 3 of the demonstration. Patient responses about care received in 2008 ranged 14 percentage points, from 71 percent (JFK Medical Center and Centrastate Medical Center) to 85 percent (Atlanticare Regional Medical Center). Among survey respondents treated at the demonstration hospitals during PY3, they ranged from 78 percent (Our Lady of Lourdes) to 87 percent (Atlanticare Regional Medical Center) compliance in giving information about what to do during their recovery at home, a range of 9 percentage points. The percentage change between the two periods among the intervention hospitals ranged from a 1 percent decrease (Our Lady of Lourdes) to a 14 percent improvement (Centrastate Medical Center).

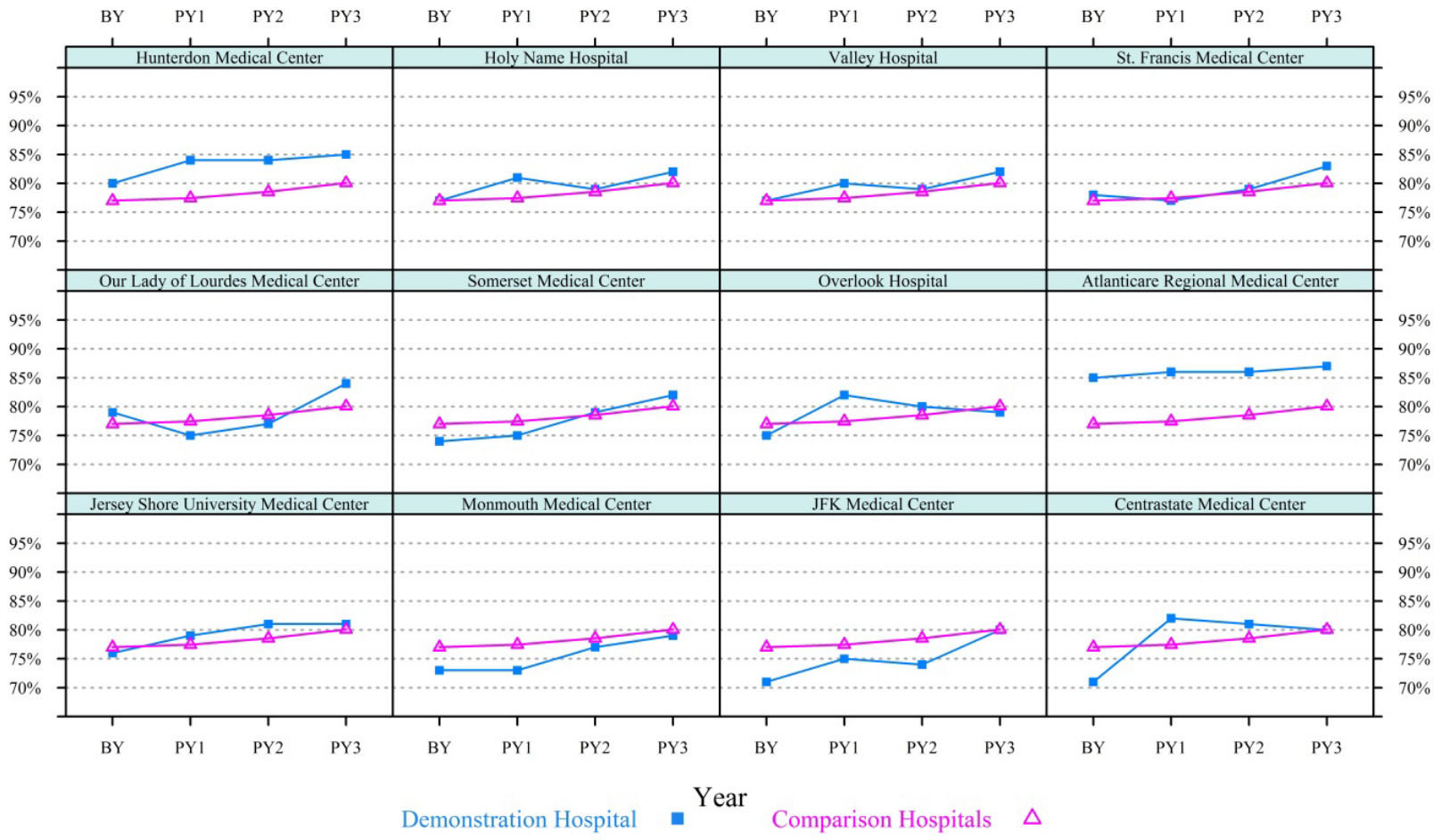
Table 7-6
Discharge information

Were patients given information about what to do during their recovery at home?	Base Year Yes, %	Year 3 Yes, %	Percentage Change
Hunterdon Medical Center	80%	84%	5%
Holy Name Hospital	77%	80%	4%
Valley Hospital	77%	80%	4%
St. Francis Medical Center	78%	79%	1%
Our Lady of Lourdes Medical Center	79%	78%	-1%
Somerset Medical Center	74%	80%	8%
Overlook Hospital	75%	80%	7%
Atlanticare Regional Medical Center	85%	87%	2%
Jersey Shore University Medical Center	76%	81%	7%
Monmouth Medical Center	73%	79%	8%
JFK Medical Center	71%	77%	8%
Centrastate Medical Center	71%	81%	14%
Comparison Hospitals	77%	79%	2%

SOURCE: September 2009 and July 2013 Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) release.

Figure 7-6 shows the change in positive responses to the question were patients given information about what to do during their recovery at home during the demonstration period for the 12 demonstration hospitals and the comparison hospitals. The percent of positive responses for the comparison hospitals increased slightly in all three performance periods. Hunterdon Medical Center and Atlanticare Regional Medical Center consistently had a higher percentage of positive responses then the comparison hospitals. JFK Medical Center consistently had a lower percentage of positive responses.

Figure 7-6
Discharge information



SOURCE: 2008-Q3 (2012) Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS).

Cleanliness of hospital environment: Patient responses to a question about the cleanliness of patient rooms and bathrooms are presented in ***Table 7-7***. The range of patients responding that their room and bathroom were "always" or "usually" kept clean among the demonstration hospitals was 10 percentage points in PY3, ranging from 85 percent (Atlanticare Regional Medical Center) to 95 percent (Somerset). Among patients treated at the intervention hospitals in 2008, responses ranged 17 percentage points from 77 percent (Atlanticare Regional Medical Center) to 94 percent (Valley Hospital). Survey respondents treated at the comparison hospitals indicated that their rooms and bathrooms were always or usually kept clean 89 percent of the time in the base year and 90 percent in PY3. The percentage change in "always" or "usually" responses ranged from -2 percent (St. Francis Medical Center) to 10 percent (Atlanticare Regional Medical Center).

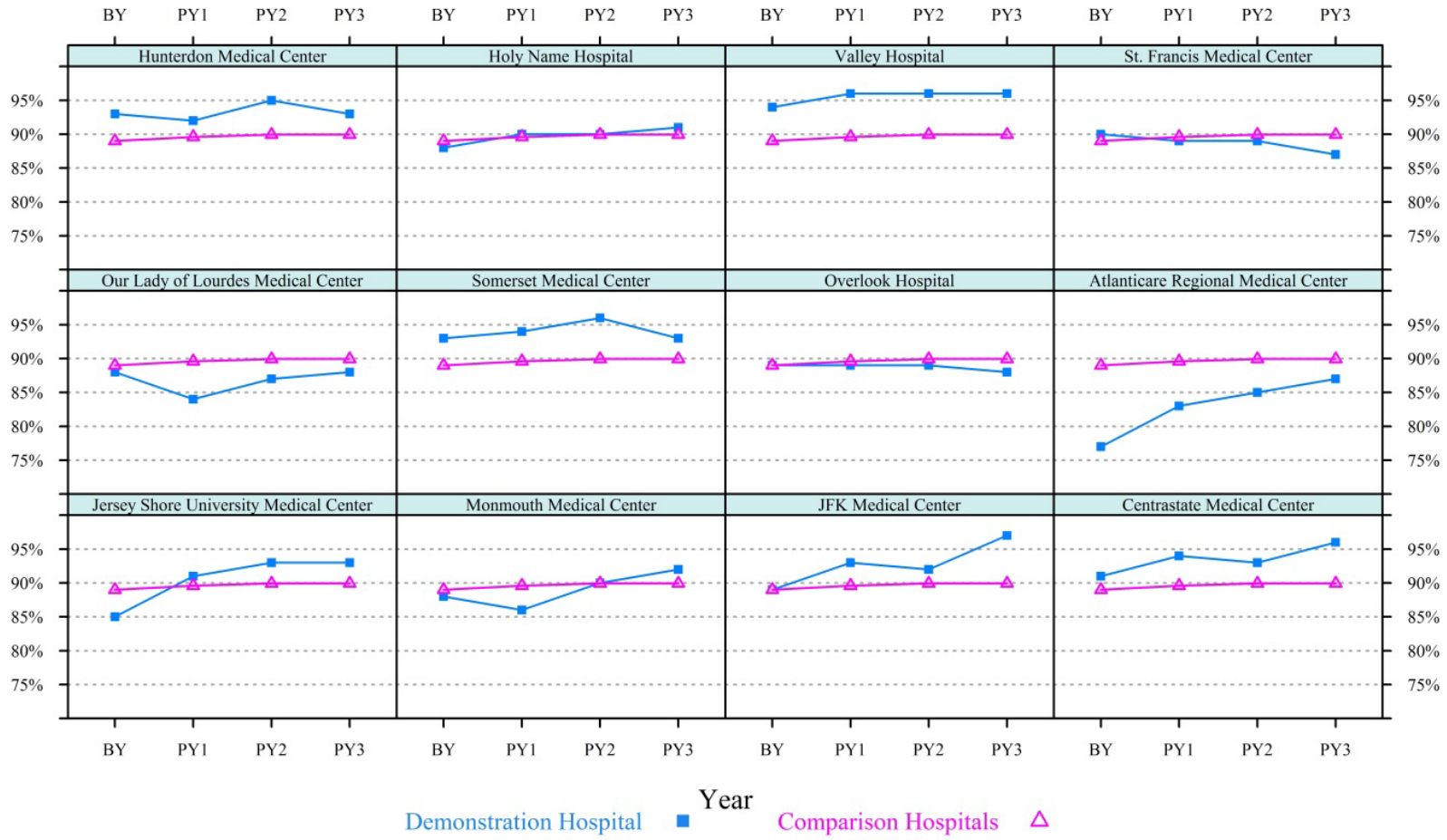
Table 7-7
Cleanliness of hospital environment

How often were the patients' rooms and bathrooms kept clean?	Base Year Always or Usually, %	Year 3 Always or Usually, %	Percentage Change
Hunterdon Medical Center	93%	94%	1%
Holy Name Hospital	88%	90%	2%
Valley Hospital	94%	96%	2%
St. Francis Medical Center	90%	88%	-2%
Our Lady of Lourdes Medical Center	88%	88%	0%
Somerset Medical Center	93%	95%	2%
Overlook Hospital	89%	88%	-1%
Atlanticare Regional Medical Center	77%	85%	10%
Jersey Shore University Medical Center	85%	93%	9%
Monmouth Medical Center	88%	91%	3%
JFK Medical Center	89%	94%	6%
Centrastate Medical Center	91%	93%	2%
Comparison Hospitals	89%	90%	1%

SOURCE: September 2009 and July 2013 Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) release.

The percentage of positive responses for each hospital for the base year, and all performance years are presented in ***Figure 7-7***. The comparison hospitals had almost no change in the positive responses to the question about cleanliness of hospital environment over the three performance periods. Hunterdon Medical Center, Valley Hospital, Somerset Medical Center, and Centrastate Medical Center outperformed the comparison hospitals in all four periods. Atlanticare Regional Medical Center had the largest change for any of the hospitals between the base year and PY3 when their positive responses increased by more than 10 percentage points.

Figure 7-7
Cleanliness of hospital environment



SOURCE: 2008-Q3 (2012) Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS).

Quietness of hospital environment: Patients were asked how often the area around their room was kept quiet at night. Responses to this question varied widely in 2008 and somewhat in PY3; results are shown in ***Table 7-8.*** Survey responses ranged 38 percentage points in 2008, from 49 percent (Holy Name Hospital) to 87 percent (Valley Hospital). Patients indicated that the area around their room was always or usually quiet at night for stays in PY3 between 79 percent (JFK Medical Center) and 89 percent (Jersey Shore Medical Center) of the time, a range of 10 percentage points. At the comparison hospitals, the rate reported was 83 percent in PY3, a two percent increase from 2008. Percentage change among the intervention hospitals ranged from -1 percent (Valley Hospital) to 69 percent (Holy Name Hospital).

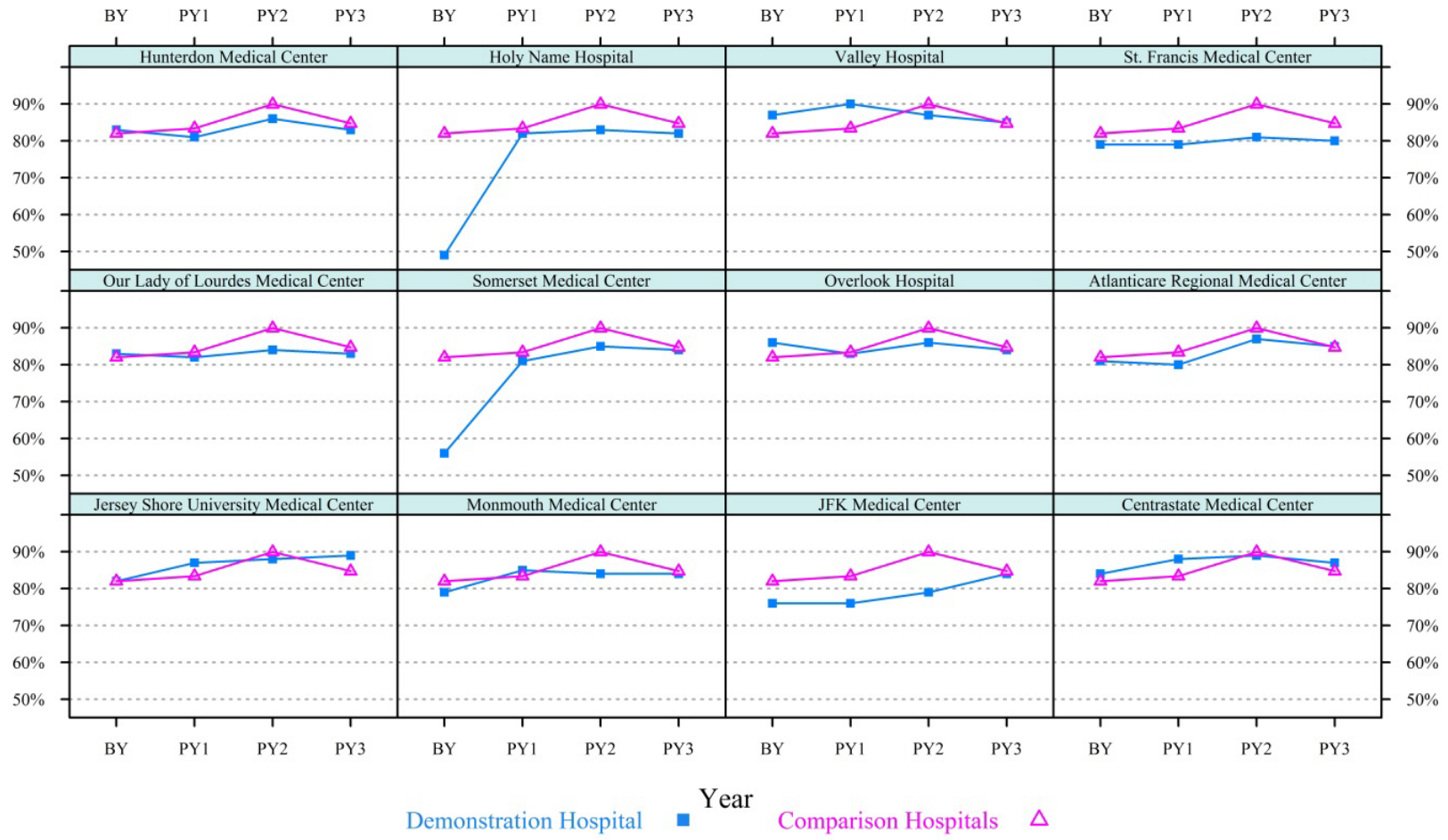
Table 7-8
Quietness of hospital environment

How often was the area around patients' rooms kept quiet at night?	Base Year Always or Usually, %	Year 3 Always or Usually, %	Percentage Change in Always or Usually
Hunterdon Medical Center	83%	85%	2%
Holy Name Hospital	49%	83%	69%
Valley Hospital	87%	86%	-1%
St. Francis Medical Center	79%	81%	3%
Our Lady of Lourdes Medical Center	83%	86%	4%
Somerset Medical Center	56%	85%	52%
Overlook Hospital	86%	87%	1%
Atlanticare Regional Medical Center	81%	84%	4%
Jersey Shore University Medical Center	82%	89%	9%
Monmouth Medical Center	79%	85%	8%
JFK Medical Center	76%	79%	4%
Centrastate Medical Center	84%	88%	5%
Comparison Hospitals	82%	83%	2%

SOURCE: September 2009 and July 2013 Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) release.

Figure 7-8 illustrates the percentage of positive responses regarding the quietness of the hospital environment for each hospital for the base year, and all performance years. The comparison hospitals increased from the base year to PY2, but then declined in PY3. None of the demonstration hospitals consistently outperformed the comparison hospitals. JFK Medical Center and Somerset Medical Center were consistently less quiet than the comparison hospitals in all periods. Two hospitals, Holy Name Hospital and Somerset Medical Center, had very large percentage point increases in positive responses between the base year and PY1.

Figure 7-8
Quietness of hospital environment



SOURCE: 2008-Q3 (2012) Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS).

Overall rating of hospital: Hospital patients surveyed were asked to rate the facility, using a 10-point scale. Results are shown in ***Table 7-9.*** Ratings of 6 or lower are considered to be "low." Ratings of 7 or 8 are considered "medium" and ratings of 9 or 10 are considered to be "high." Survey respondents gave the hospitals a medium or high rating between 85 percent (St. Francis and JFK Medical Centers) and 94 percent (Valley Hospital) of the time in PY3. For hospital stays in 2008, patients at the intervention hospitals rated the hospital as medium or high ranging from 82 percent (JFK Medical Center) to 94 percent of the time (Valley Hospital). The percentage change in medium and high ratings between the two periods ranged from -2 percent (Hunterdon Medical Center) to 5 percent (Atlanticare and Jersey Shore). The group of comparison hospitals received a medium or high rating from 89 percent of patients surveyed in PY3, an increase of 1 percent from 2008.

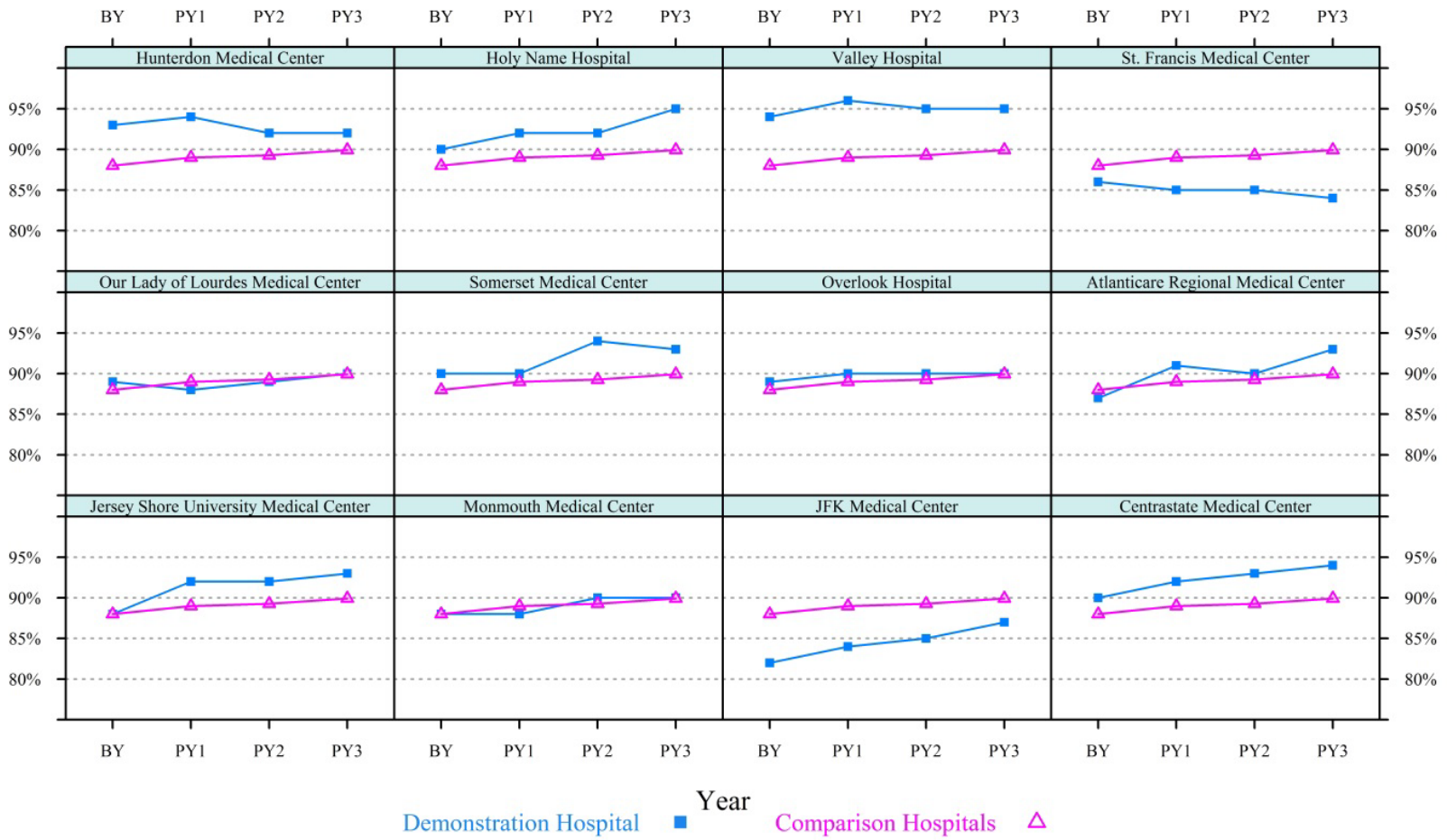
Table 7-9
Overall rating of hospital

How do patients rate the hospital overall?	Base Year Medium or High, %	Year 3 Medium or High, %	Percentage Change
Hunterdon Medical Center	93%	91%	-2%
Holy Name Hospital	90%	92%	2%
Valley Hospital	94%	94%	0%
St. Francis Medical Center	86%	85%	-1%
Our Lady of Lourdes Medical Center	89%	89%	0%
Somerset Medical Center	90%	93%	3%
Overlook Hospital	89%	90%	1%
Atlanticare Regional Medical Center	87%	91%	5%
Jersey Shore University Medical Center	88%	92%	5%
Monmouth Medical Center	88%	91%	3%
JFK Medical Center	82%	85%	4%
Centrastate Medical Center	90%	93%	3%
Comparison Hospitals	88%	89%	1%

SOURCE: September 2009 and July 2013 Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) release.

Figure 7-9 presents the change in positive responses regarding the overall rating of the hospital during the demonstration period. Positive responses at the comparison hospitals increased slightly from the base year to PY3. Four hospitals (Hunterdon Medical Center, Holy Name Hospital, Valley Hospital, and Centrastate Medical Center) had a higher percent of positive response than the comparison group for the base year and each of the performance years. St. Francis Medical Center and JFK Medical Center both had the percent of positive ratings by patients below those of the comparison hospitals for the base year and the demonstration years.

Figure 7-9
Overall rating of hospital



SOURCE: 2008-Q3 (2012) Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS).

Willingness to recommend hospital: Table 7-10 presents results for patients' willingness to recommend the hospital to friends and family. Answers to this question were mostly homogeneous across all hospitals. Patients responded that they would recommend the hospital 91 percent (St. Francis Medical Center) to 97 percent (Hunterdon and Valley Medical Centers) of the time in 2008 and between 88 percent (St. Francis Medical Center) and 97 percent (Valley Hospital) of the time in PY3. Of survey respondents treated at the comparison hospitals, 93 percent would probably or definitely recommend the hospital in 2008 and in PY3. The percentage change from 2008 to PY3 ranged from – 3 percent (St. Francis Medical Center) to 2 percent (Our Lady of Lourdes Medical Center and Jersey Shore).

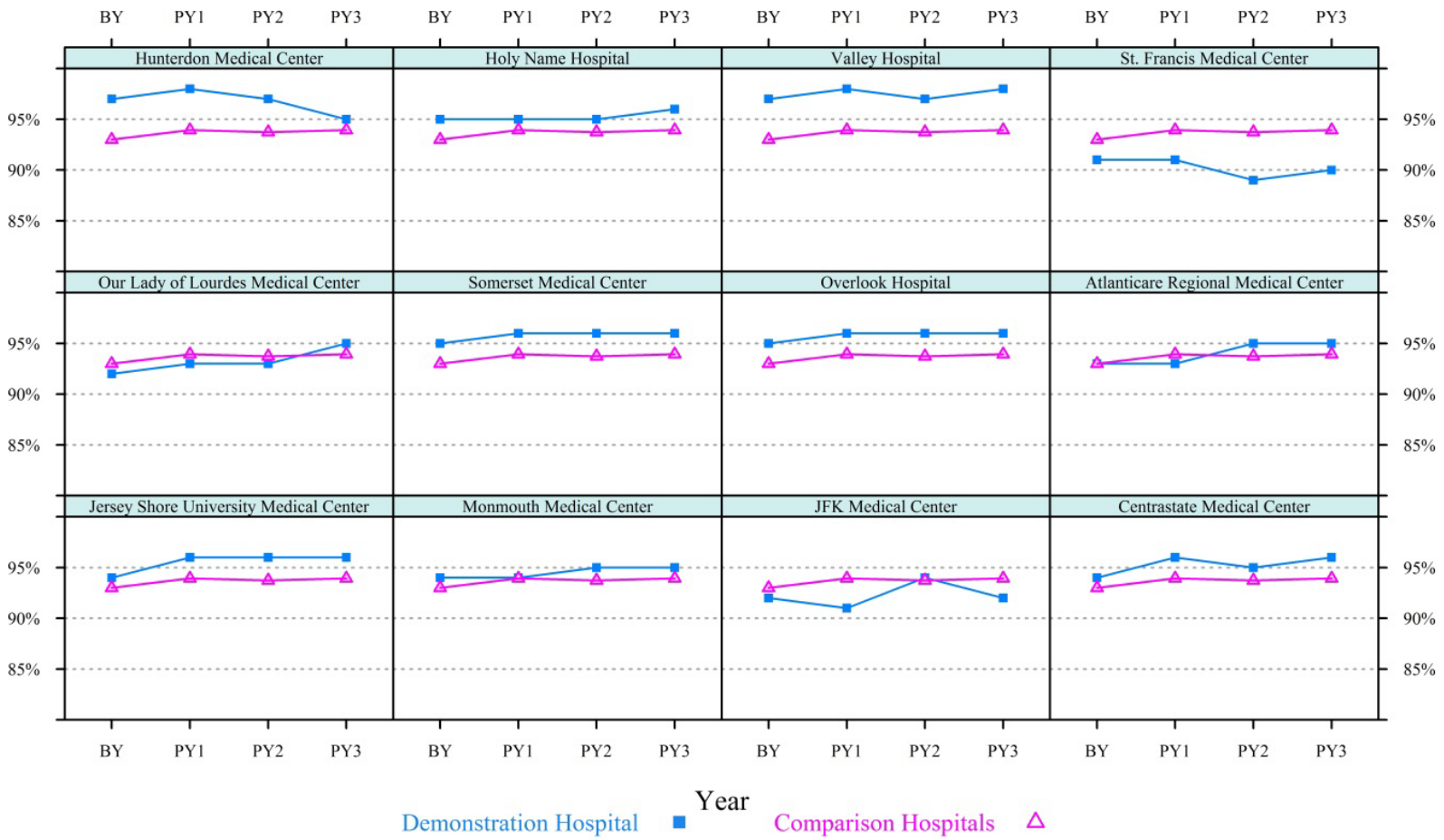
Table 7-10
Willingness to recommend hospital

Would patients recommend the hospital to friends and family?	Base Year Probably or Definitely, %	Year 3 Probably or Definitely, %	Percentage Change
Hunterdon Medical Center	97%	96%	-1%
Holy Name Hospital	95%	95%	0%
Valley Hospital	97%	97%	0%
St. Francis Medical Center	91%	88%	-3%
Our Lady of Lourdes Medical Center	92%	94%	2%
Somerset Medical Center	95%	96%	1%
Overlook Hospital	95%	96%	1%
Atlanticare Regional Medical Center	93%	94%	1%
Jersey Shore University Medical Center	94%	96%	2%
Monmouth Medical Center	94%	95%	1%
JFK Medical Center	92%	93%	1%
Centrastate Medical Center	94%	95%	1%
Comparison Hospitals	93%	93%	0%

SOURCE: September 2009 and July 2013 Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) release.

The percentage of patients probably or definitely willing to recommend the hospitals to their friends or family for the base year and all demonstration years is presented in ***Figure 7-10***. A higher percentage of patients were willing to recommend seven of the demonstration hospitals (Hunterdon Medical Center, Holy Name Medical Center, Valley Hospital, Somerset Medical Center, Overlook Hospital, Jersey Shore University Medical Center and Centrastate Medical Center) than the comparison hospitals for the base year and all three performance periods. Only one hospital (St. Francis Medical Center) consistently had a lower percentage of patients willing to recommend the hospital than the comparison hospitals.

Figure 7-10
Willingness to recommend hospital



SOURCE: 2008-Q3 (2012) Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS).

7.3 Difference in Differences Results

We present the results of a simple descriptive 2D analysis of the ten HCAHPS measures in ***Table 7-11***. The differences presented in the table represent the difference across time and the difference between each hospital and the comparison group. For each of the nine measures that consist of a 3-part question, we use the percentage of patients that chose the two most positive answers. For example, in the table below, "Communication with nurses" refers to the percentage of patients who answered that nurses always or usually communicated well.

The majority of the difference in differences appears quite small; most are between -6 percent and 7 percent with more than half between -2 and 2 percent. There were some cases of larger differences in pain management, cleanliness and quietness of hospital environment. In particular, JFK Medical Center had a large improvement (14%) over time relative to the comparison group in the percentage of patients indicating that their pain was always or usually managed well. Both Holy Name Hospital (33%) and Somerset Medical Center (28%) had large improvements in the share of patients indicating that the hospital environment was always or usually quiet. The largest decrease was a 7 percent decline over time, against the comparison group in responsiveness of staff at St. Francis Medical Center.

Because these estimates are based on a single observation for each hospital in each period, we cannot test the statistical significance of these estimates.

7.4 Discussion

The data presented above analyze the HCAHPS beneficiary satisfaction survey findings for the PHC demonstration and comparison sites over time. The results, which are based on these comparisons of the demonstration and comparison hospitals, show in general that hospitals performed at similar levels during the third performance year. The PHC demonstration does not appear to have had an impact on the perceptions of care by Medicare beneficiaries. Given that an emphasis of gainsharing was to reduce costs in part through reductions in lengths of stay and efficiencies that often translated into clinically appropriate restrictions in care, lack of an impact on beneficiary satisfaction suggests that patients were either unaware and/or accepting of these changes.

There was very little variation (less than 10 percentage points) in patient responses to questions about communication with nurses and doctors, pain management, communication about medicines, in patients' overall ratings of the hospital, and patients' willingness to recommend the hospital to friends and family. There was some variation (between 10 and 20 percentage points) in how patients answered questions about the responsiveness of hospital staff, information provided about continuing recovery at home, how clean patients found the hospital, and quietness of hospital rooms. Although these measures are more general (i.e., not limited to the episodes of care defined for claims data) and are not specific to service lines, they do provide additional details on quality of patient care that are not available in claims data.

Table 7-11
Difference-in-differences (2D) estimates of HCAHPS measures

Hospital	Communi-cation with nurses	Communi-cation with doctors	Responsive-ness of staff	Pain manage-ment	Communi-cation about medication	Discharge information	Cleanli-ness	Quiet-ness	Overall rating	Willingness to recommend
Hunterdon Medical Center	1%	1%	1%	1%	2%	2%	0%	1%	-3%	-1%
Holy Name Hospital	0%	2%	3%	4%	5%	1%	1%	33%	1%	0%
Valley Hospital	0%	0%	2%	-1%	1%	1%	1%	-2%	-1%	0%
St Francis Medical Center	-1%	2%	-7%	-1%	2%	-1%	-3%	1%	-2%	-3%
Our Lady of Lourdes Medical Center	0%	0%	-1%	-1%	-3%	-3%	-1%	2%	-1%	2%
Somerset Medical Center	1%	1%	5%	-2%	4%	4%	1%	28%	2%	1%
Overlook Hospital	1%	2%	5%	0%	0%	3%	-2%	0%	0%	1%
Atlanticare Regional Medical Center	2%	2%	4%	0%	4%	0%	7%	2%	3%	1%
Jersey Shore University Medical Center	1%	2%	3%	1%	2%	3%	7%	6%	3%	2%
Monmouth Medical Center	3%	0%	5%	5%	5%	4%	2%	5%	2%	1%
JFK Medical Center	1%	1%	3%	14%	1%	4%	4%	2%	2%	1%
Centrastate Medical Center	1%	-2%	6%	-2%	-2%	8%	1%	3%	2%	1%

SOURCE: Q1 (2008) - Q4 (2008) and Q4 (2011) - Q3 (2012) Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS).

When the differences in differences were examined, several hospitals stood out from the rest. JFK Medical Center had a 21 percent increase in their pain management against the comparison hospitals in PY3. In terms of quietness, Somerset Medical Center and Holy Name Hospital had increases of 47 and 64 percent respectively against the comparison hospitals. There were not any notable declines in patient satisfaction at the intervention hospitals, which points to the finding that the gainsharing demonstration did not result in negative effects on the patient satisfaction at the participating hospitals.

SECTION 8
MARKET ANALYSIS AND PHYSICIAN REFERRAL PATTERNS

One potential policy concern regarding gainsharing models is that participating physicians may refer more costly patients, including those more likely to have medical complications, to non-demonstration hospitals and treat the less complex patients at gainsharing-participating hospitals. Less complex patients are easier to manage, so gainsharing participating physicians may have a financial incentive to treat difficult cases (that would negatively affect their likelihood of receiving performance payments) at gainsharing hospitals where performance is measured in part by cost.

Participating physicians who have admitting privileges at other hospitals have more discretionary ability to selectively direct patients in response to gainsharing incentives than physicians with no other admitting alternatives.[13] Once one of their patients is admitted to a demonstration hospital, participating physicians with admitting privileges at multiple local acute care hospitals may also have an incentive either to transfer very costly and difficult-to-manage cases to other non-demonstration acute care hospitals (Inpatient Prospective Payment System [IPPS] transfers) or to discharge them earlier to post-acute care (PAC) providers.[14] An increase in either admitting fewer high-cost patients or transferring severe, difficult-to-manage cases may manifest itself in a reduction in unprofitable cases (especially IPPS outlier cases). This is an example of how hospital and physician incentives can align in an undesirable manner.

In this section we present descriptive and difference-in-differences regression analyses aimed at addressing these issues. The first analysis looks at the size of average incentive payments by participating hospital. Then we present a basic market analysis, using descriptive statistics to look at the distribution of patients at participating demonstration and comparison hospitals, emergency room (ER) admissions, outliers, severity of admissions. Next, we look at physician referral patterns and any impact of the demonstration on those patterns. We begin our physician referral analysis by looking at the number of participating physicians with admissions at other acute care hospitals including comparison hospitals. We then look at transfer rates for physicians at participating hospitals and average severity of those transfers.

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[13] Research by Adamache and Cromwell (2004a, b; 2006) in New Jersey and Oklahoma City for CMS showed remarkably few physicians who actively admitted to two or more local hospitals.

[14] Favorable patient selection among physician owners of specialty hospitals suggests similar financial incentives for physicians sharing in increased hospital profits from lower costs in not-for-profit demonstration hospitals.

8.1 Data and Measures

The primary sources of data for this section are the base year and performance year inpatient claims associated with episodes of care at participating and comparison hospitals that were provided by ARC. The inpatient data was then processed through the 3M® APR®-DRG Grouper to generate a severity score for each inpatient admission.[15]

Next, we assigned each inpatient admission a responsible physician and then all admissions for the same physician were linked together. The first step in this process was to assign a responsible physician to each inpatient claim. To assign the responsible physician, we followed the approach laid out in the NJHC protocol. For surgical DRGs, the responsible physician was the operating (UPIN or NPI) if the UPIN or NPI was valid. If the operating UPIN/NPI was not valid, then we looked at the Other UPIN or NPI. If the other UPIN/NPI was not valid, then we looked at the attending UPIN and NPIs. If none of these were valid, no responsible physician was assigned to the claim. For medical DRGs, the responsible physician was the identified by the attending physician's UPIN or NPI. If the attending physician's UPIN/NPI was not valid, then no responsible physician was assigned to the claim.

In the second step, we created a unique physician ID linking all the UPINs and NPIs associated with one physician. This was necessary because our initial analysis of the base year data showed that hospitals were still coding UPINs rather than NPIs in more than 30 percent of the admissions. To create the unique physician ID, we first extracted from the ARC inpatient file all valid physician UPINs and NPIs. We then matched the UPINs and NPIs against the 2012 NPPES database to link the associated UPINs and NPIs. In most cases, one UPIN was associated with no more than two NPIs.[16] We found 48 cases where one NPI was associated with 2 UPINs. In these instances, if the legal name of the provider matched, then we assigned both UPINs to the same physician ID. If the legal name of the provider did not match, we dropped those UPINs. Most of these base year problems were not as extensive in the three performance years.

8.2 Methods

We hypothesized that gainsharing-participating physicians may have had an incentive to steer more severe cases to other hospitals where they had privileges in order to increase their demonstration performance payments. We also hypothesized they may have had an incentive to transfer (IPPS transfers) costly and/or difficult-to-manage cases to other short-term acute-care hospitals. Consequently, we determined, using multivariate analyses, whether demonstration hospitals had, relative to comparison hospitals, a decrease in admissions classified as major or extreme severity between the base year and the demonstration period. We also investigated whether

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[15] APR-DRGs are an enhanced extension of the basic DRG concept developed by 3M's Clinical Research Group, the National Association of Children's Hospitals and Research Institutes, and several physician groups.

Whereas DRGs focus on the Medicare population, APR-DRGs describe a complete cross-section of acute care patients and are specifically designed to adjust data for severity of illness (How sick is the patient?) and risk of mortality (How likely is it that the patient will die?). The fundamental principle of APR-DRGs is that the severity of illness and risk of mortality are both dependent on the patient's underlying condition. High severity of illness and risk of mortality are characterized by multiple serious diseases and the interactions between the disorders.

[16] There was one instance where one UPIN was associated with four NPIs.

demonstration hospitals had, relative to comparison hospitals, an increase in IPPS transfers to other short-term acute-care hospitals. We tested these hypotheses empirically using a multivariate 2D[17] analysis to model the probability that an admission was of major or extreme severity using a logistic model following the general form specified in Equation 5-1. IPPS transfers were also investigated using similar 2D models.

Unlike the payment and cost (Section 5) and quality (Section 6) analyses, this section focuses on patient selection. An issue in patient selection analyses is whether patient characteristics should be include as explanatory variables in multivariate analyses. If the analytic issue is "who are the types of patients being admitted or transferred," the patient characteristics should be included as explanatory variables. When the analytic issue is the behavior of hospitals, then the use of patient characteristics is subject to re-examination.

To understand the analytic issues, we first discuss the inherent incentives of Medicare's IPPS. Basic MS-DRG payments are based on national average standardized costs. Hospitals paid under the IPPS have an incentive to not admit patients who are expected to cost more than the national average. And if admitted, facilities have an incentive to transfer such patients to other hospitals paid under Medicare's IPPS. When IPPS transfers occur, Medicare pays hospitals on a per diem basis up to the standard IPPS payment amount. Hospitals have been operating under the IPPS system since 1984 and, thus, are aware of the incentives and payment penalties. The PHC Demonstration, even with its safeguards, provides participating hospitals greater incentives to avoid costly cases.

With regard to patient characteristics, the question is whether hospitals and their physicians use readily-observable patient characteristics to help assess the costliness of cases (relative to the anticipated IPPS payment). Patient age and other patient characteristics, for example, might be proxies for "costliness" in such assessments. Assuming this is the case and if gainsharing physicians and hospitals increase, during the demonstration, their usage of patient characteristics to directly or indirectly assess costliness in their admission and transfer decisions, then the inclusion of patient characteristics as explanatory variables affects the magnitude and statistical significance of the 2D estimator. That is, inclusion of patient characteristics assigns part of the demonstration impact to patient characteristics instead of the 2D estimator.

The use of patient characteristics, if present, might be more of a factor for transfer decisions than for admission decisions. One reason is that more than 65 percent of admissions are through the emergency room. This reduces the scope in which patient characteristics might be factors in the admission process. Another reason is that, during admission, it might be more difficult to associate patient characteristics with costliness. This, in turn, depends on how well the admitting physician is knowledgeable about the patient's general health as well as the acuity of the admitting condition. Once the patient is admitted and treatment has commenced, it becomes more obvious whether the patient will be costly relative to payment.

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[17] There are several types of difference-in-differences (DID) regression models. The "2D" model is commonly used when there is data for only one pre period. When data for multiple pre periods are available, a "3D" approach is possible that accounts for pre-existing trends in behavior. Since the PHC Demonstration has only one year of pre-demo data, we use a 2D approach. The terms 2D and DID are used interchangeably in this report.

Of the four hospital characteristics used in Sections 5's multivariate analyses, three are used in the patient selection multivariate analyses: the number of short-term acute-care beds, the intern/resident to bed ratio, and the IPPS disproportionate share adjustment factor. These characteristics are included for two reasons. First, to the extent that the comparison hospitals are incompletely balanced with the demonstration hospitals, inclusion of hospital characteristics compensates for such imbalance. Second, smaller, non-teaching hospitals might have limited capability to treat complex patients (that also might be more costly than average). Appropriate medical care might dictate the such patients, once stabilized, be transferred to large and teaching hospitals. Because there are fewer plausible places to transfer more complex patients, large and teaching hospitals might be less likely to transfer these cases. These issues are pertinent to the admission decision as well, but perhaps, with less force.

Hospital characteristics are included in all estimated 2D models. The hospital-characteristics 2d model is our preferred model. However, despite the ambiguity of including patient characteristics, 2D models including them were also estimated. In addition to the patient (e.g., age, and HCC risk score) and hospital characteristics explanatory variables and the T, D, and the T*D interaction terms specified in Equation 5-1, new explanatory variables used in the logit regressions are (1) whether the beneficiary is admitted through the ER and (2) whether the beneficiary is transferred in from a skilled nursing facility (SNF).

As in Section 5, alternative specifications for the time components of the 2D models were tested. These were the year-specific specification discussed in Section 5 and a time-trend specification. Results for both multivariate analyses are presented in ***Section 8.4***.

8.3 Descriptive Results

Size of Gainsharing Incentive Payments: Although gainsharing payments were usually small at the individual physician level, and therefore unlikely to influence whether a participating physician would (or would not) admit a case to a demonstration hospital, larger bonus payments may increase the probability of this physician response. During the three years of the demonstration, the twelve participating hospitals paid out more than $15.7 million in incentives. ***Table 8-1*** shows the average physician incentive payment for each six-month payment period by hospital for the demonstration. The size of the average incentive payments varied across hospitals. In the first incentive period, July 2009 to December 2009, payments varied from an average of $1,342 at Somerset Medical Center to $4,525 at Atlanticare Regional Medical Center. During the second incentive period, January 2010- June 2010 average payments ranged from $1,375 at JFK Medical Center to $6,058 at Atlanticare Regional Medical Center. From July 2010 to December 2010 payments varied from an average of $1,667 at Somerset Medical Center to an average of $3,418 at Valley Hospital. In the next period, January 2011- June 2011, payments ranged from $1,684 at JFK Medical Center to $4,808 at Atlanticare Regional Medical Center. From July 2011 to December 2011 the average incentive payments varied from $0 at Atlanticare Regional Medical Center to $3,686 at Our Lady of Lourdes Medical Center. In the last period, payments ranged from $0 at Atlanticare Regional Medical Center to $3,933 at Valley Hospital.[18]

[18] ARC, Physician Hospital Collaboration Monitoring Report #5: Internal Hospital Costs and Physician Payments, (July 2009-June 2012), April 2014.

Table 8-1
Average incentive payment per physician, demonstration years 1-3

Hospital	Average Incentive Payment (in $) July 2009-December 2009	Average Incentive Payment (in $) January 2010-June 2010	Average Incentive Payment (in $) July 2010-December 2010	Average Incentive Payment (in $) January 2011-June 2011	Average Incentive Payment (in $) July 2011-December 2011	Average Incentive Payment (in $) January 2012-June 2012
Hunterdon Medical Center	1,823	2,208	2,394	2,586	3,089	3,918
Holy Name Hospital	2,625	2,626	2,082	2,793	2,423	2,739
Valley Hospital	2,875	3,249	3,418	3,808	3,481	3,933
St. Francis Medical Center	1,974	1,800	1,716	1,865	1,992	2,702
Our Lady of Lourdes Medical Center	2,799	3,801	2,941	3,610	3,686	3,444
Somerset Medical Center	1,342	1,437	1,667	1,805	1,811	2,264
Overlook Hospital	2,552	2,208	2,218	2,396	1,917	3,028
Atlanticare Regional Medical Center	4,525	6,058	2,843	4,808	0	0
Jersey Shore University Medical Center	2,683	2,180	2,142	2,710	2,505	2,263
Monmouth Medical Center	1,997	2,522	1,848	1,791	1,511	1,433
JFK Medical Center	1,797	1,375	2,019	1,684	2,243	2,140
Centrastate Medical Center	3,031	2,785	2,452	3,128	2,932	3,681
Weighted Average	2,492	2,480	2,252	2,596	2,364	2,619

SOURCE: ARC Physician Hospital Collaboration Monitoring Report #5: Internal Hospital Costs and Physician Incentive Payments Tables 2a-2g

The average incentive payment across the twelve hospitals did not vary greatly over the six payment periods. In particular, there is no particular trend in average incentive payments over the four incentive periods. Average incentive payments at three participating hospitals, Hunterdon Medical Center, and Somerset Medical Center, steadily increased from the first period to the sixth. For the other ten hospitals, there was no evident pattern in average incentive payments over time. No hospital had continuously declining average incentive payments. However, average incentive payments in three hospitals were lower in the sixth period than in the first period.

For the first, second and fourth periods, Atlanticare Regional Medical Center had higher than average incentive payments. However, there was a large drop in average incentive payments between the first and second demonstration years and again between the second and third demonstration years. In the third demonstration year Atlanticare had no physicians receiving any incentive payments. A possible explanation is during the demonstration Atlanticare switched from using mostly private physicians to using mostly hospitalists. Many of the hospitalists were not employed at Atlanticare when the gainsharing demonstration began and were therefore not eligible for bonus payments.

***Market Analysis*:** In this section, we provide a brief overview of the hospital marketplace of the PHC demonstration and comparison hospitals. Base year and the third year of the demonstration results are presented in tables for this market analysis. These are supplemented by graphs contrasting each demonstration hospital and to the comparison hospitals for each analytic time period. In light of the market analysis, we analyzed physician referral patterns between and among the participating and comparison sites.

To describe the New Jersey hospital marketplace, we analyzed the number of base year and performance year 3 eligible inpatient admissions, the percent of admissions through the emergency room, the percent of admissions that resulted in outlier payments, and the severity of admissions. An eligible admission was defined as the admission which triggered the episode of care under the demonstration protocol. Under the demonstration protocol, an eligible admission must meet the following criteria.

1. The beneficiary must have been continuously enrolled in Part A and B during the entire episode of care.

2. The beneficiary was not enrolled in a Medicare Advantage plan.

3. The beneficiary was not in end-stage renal disease.

4. The beneficiary was not in hospice.

5. The discharge DRG was not on the list of excluded DRGs.[19]

The number of eligible admissions varied from fewer than 1,500 at St. Francis Medical Center to approximately 8,000 at Valley Hospital (refer to Table 6-1 for additional detail). The number of eligible admissions fell for ten of the 12 participating hospitals between the base year

[19] Almost all DRGs were included in the demonstration. The majority of excluded DRGs were for pediatrics, obstetrics, psychiatry, and substance abuse.

and PY3. For the participating hospitals as a group, there was a 10 percent decline in admissions, smaller than the 13 percent decline for the comparison hospitals as a group.[20] The number of eligible admissions fell more than 10 percent Valley Hospital, St. Francis Medical Center, Our Lady of Lourdes Medical Center, Somerset Medical Center, Jersey Shore University Medical Center, JFK Medical Center, and Centrastate Medical Center while eligible admissions increased 12 percent at Overlook Hospital.

Market Analysis—Emergency Rooms: Emergency rooms are an important source of inpatient and outpatient referrals. When a patient visits a hospital's emergency room, it increases the likelihood that a patient will be admitted to that hospital because the critical nature of emergency room cases reduces physician discretion in the decision to admit the patient. Consequently, to the extent that a hospital has a "busier" emergency room, a larger fraction of patients may be admitted through an emergency room rather than a physician referral. However emergency rooms tend to attract a higher acuity patient when admitted which could lead to higher costs. In an area like New Jersey where beneficiaries often have the option of using more than one hospital's emergency room, many factors may play into which emergency room they choose visit. If a patient is in a highly acute situation, such as a burn, heart attack or stroke, the patient (or their proxy) may choose the closest emergency room or may be directed to a specific emergency room by the protocol of the ambulance service. In some non-acute situations, beneficiaries may chose an emergency room based upon its capabilities, select an emergency room that is "more pleasant" or where the wait is typically less. For example, some emergency rooms allow patients to see how long the wait is prior to arrival.

Table 8-2 shows the percent of base year and PY3 admissions from the emergency room (ER).[21] There is a wide variation in ER admissions from the mid-60s, in the base year, at Jersey Shore University Medical Center to the mid-80s at Centrastate Medical Center. The comparison sites have slightly higher ER admission rates. ER admissions increased at nine of the 12 participating hospitals with the largest increases at Somerset Medical Center, St. Francis Medical Center, and Our Lady of Lourdes Medical Center. In some cases, the number of ER admissions increased at demonstration hospitals even though their admissions were falling. As can be seen in ***Figure 8-1***,[22] there is large variation over the course of the demonstration in the relative changes of individual participants to those for the comparison hospitals. Two noteworthy changes are for St. Francis Medical Center and Monmouth Medical Center where their PY3 experience differed considerably from the previous performance years. For St. Francis, the share of admissions through the ER increased over 15 percentage points between PY2 and PY3. For Monmouth, on the other

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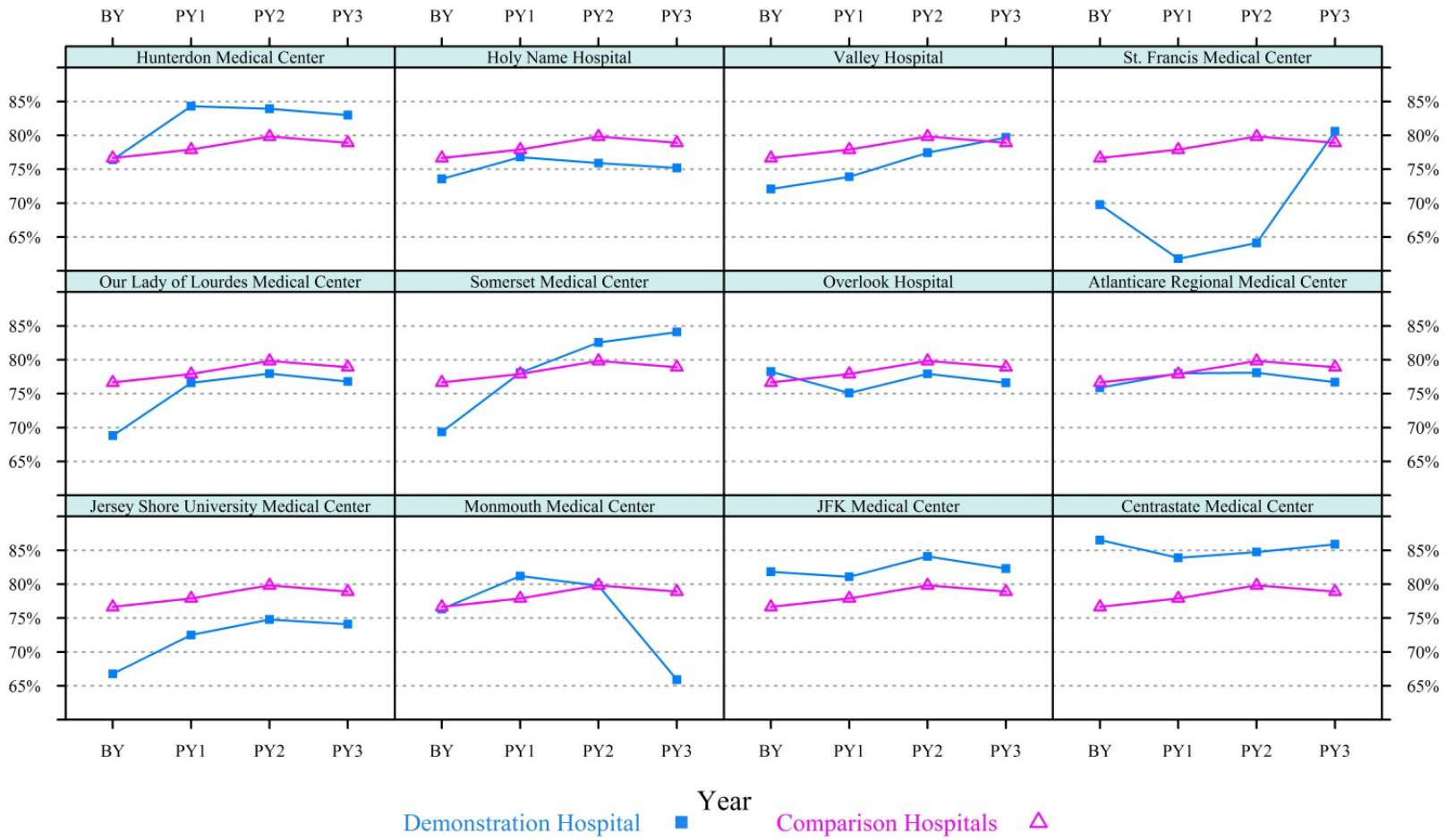
[20] Using American Hospital Association data, MedPAC presented national statistics showing inpatient admissions for all payers fell from 2008 through 2012 (MedPAC, *A Data Book*, June 2014, p. 58). Total Medicare FFS inpatient discharges fell from 13 million in 2005 to 11.5 million in 2011 (CMS Statistics Reference Booklet, 2013, Table IV.1, p. 36).

[21] Because of a change in the admission source data element on inpatient claims since the Year 1 report, we've changed the method to identifying ER admissions by using the presence of an ER revenue center code on a claim.

[22] For each of the figures showing rates for each participating hospital, there is an appendix table showing the rates for the base year and each of the performance years for each participating hospital as well as the average for the comparison hospitals.

Figure 8-1
Share of admissions through the emergency room



NOTES: Emergency room (ER) admissions identified by presence of an ER revenue center code on a Medicare claim.

SOURCE: RTI processing of Medicare claims.

Table 8-2
Base year and Year 3 emergency room admissions at participating and comparison hospitals

Hospital	Percent of admissions through the ER		Year 3 minus base year
	Base year	Year 3	
Hunterdon Medical Center	76.4	83.0	6.6
Holy Name Hospital	73.6	75.2	1.6
Valley Hospital	72.1	79.7	7.6
St. Francis Medical Center	69.8	80.6	10.9
Our Lady of Lourdes Medical Center	68.8	76.8	8.0
Somerset Medical Center	69.4	84.1	14.8
Overlook Hospital	78.2	76.6	-1.7
Atlanticare Regional Medical Center	75.9	76.7	0.9
Jersey Shore University Medical Center	66.8	74.1	7.3
Monmouth Medical Center	76.3	65.9	-10.5
JFK Medical Center	81.8	82.3	0.5
Centrastate Medical Center	86.5	85.9	-0.6
Comparison Hospitals	76.6	78.9	2.3

NOTES: Emergency room (ER) admissions identified by presence of an ER revenue center code on a Medicare claim.

SOURCE: RTI Analysis of Medicare Claims

hand, its ER share fell nearly 15 percentage points between PY2 and PY3. On average, the rate of ER admissions at the participating hospitals increased 3.9 percentage points from 74.3 percent in the base year to 78.2 percent in PY3 while the percentage of ER admissions at comparison hospitals increased 2.3 percentage points.

Market Analysis—Cost Outliers*:** Under the demonstration, the participating hospitals can achieve cost savings by admitting fewer potentially high cost patients to their hospitals. ***Table 8-3 shows the percent of base year and PY3 admissions that were cost outliers for participating and comparison hospitals.[23] Overall, the percentage of outlier discharges was less than 3 percent at participating hospitals during the base year, with an average of about 1.4 percent. The values ranged from less than ½ of 1 percent at Holy Name Hospital, JFK Medical Center, and Centrastate Medical Center to more than 2.5 percent. The comparison hospitals averaged 1.19 percent cost outliers in the base year.

[23] For consistency with Section 5, the method for identifying cost outliers in Section 8 was changed from use of a condition code to the presence of outlier payments on claims.

Table 8-3
Base year and Year 3 cost outliers at participating and comparison hospitals

Hospital	Percent cost outliers		Year 3 minus base year
	Base year	Year 3	
Hunterdon Medical Center	2.56	3.43	0.87
Holy Name Hospital	0.44	0.47	0.02
Valley Hospital	1.73	1.36	-0.37
St. Francis Medical Center	1.47	1.86	0.39
Our Lady of Lourdes Medical Center	1.04	1.08	0.04
Somerset Medical Center	1.13	2.93	1.80
Overlook Hospital	1.62	2.32	0.70
Atlanticare Regional Medical Center	2.74	2.97	0.22
Jersey Shore University Medical Center	1.36	1.74	0.38
Monmouth Medical Center	0.72	0.50	-0.21
JFK Medical Center	0.46	0.31	-0.15
Centrastate Medical Center	0.44	0.36	-0.08
Comparison Hospitals	1.19	1.47	0.28

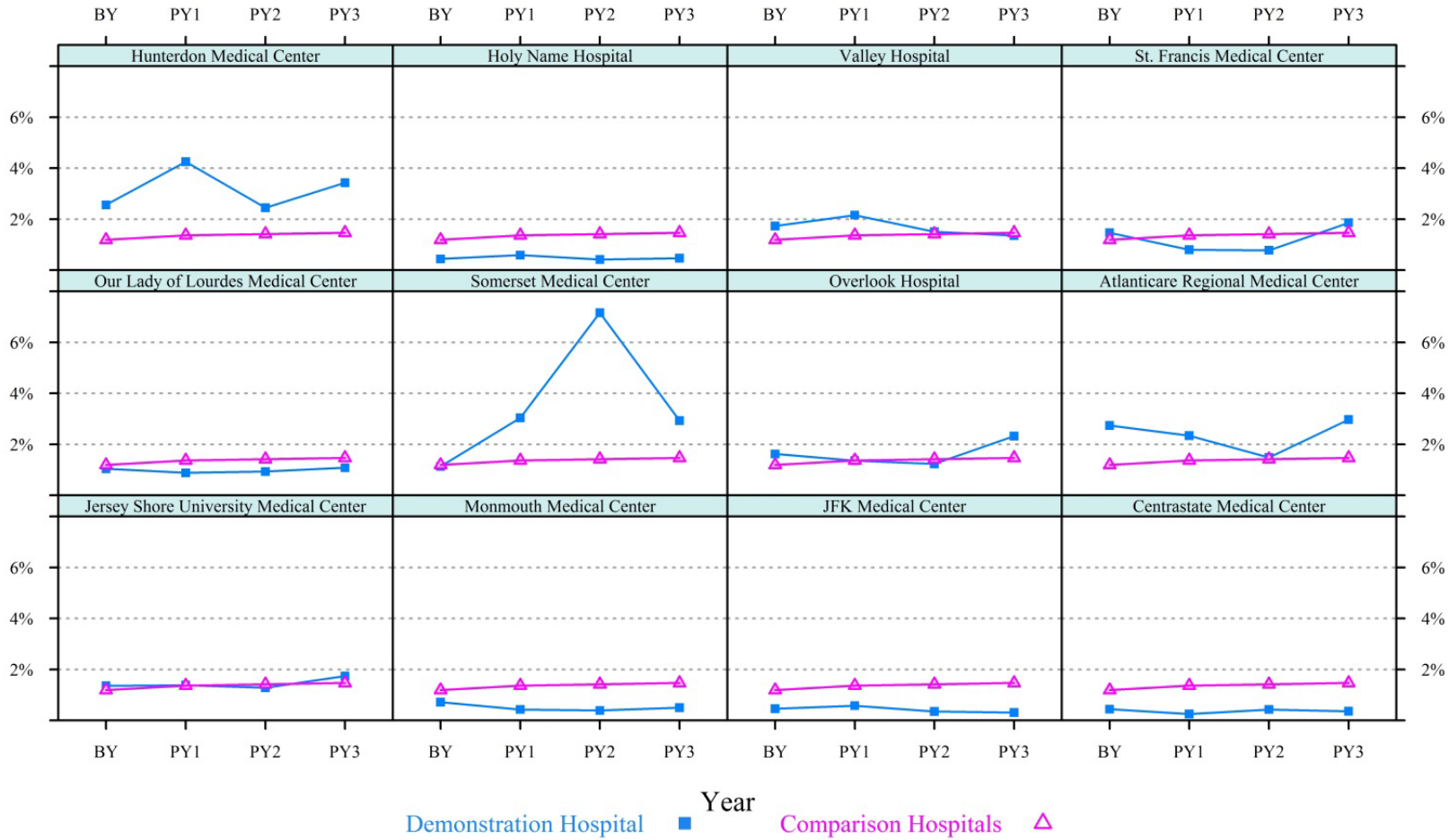
NOTE: An inpatient admission was deemed a cost outlier if an outlier payment was present on the claim.

SOURCE: RTI Analysis of Medicare Claims

Four of the participating hospitals had a lower share of outliers in PY3. Holy Name Hospital had a tiny change from 0.44 to 0.47 percent, a change under 0.03 percentage points. Somerset Medical Center, however, had a large increase in outliers even though admissions fell: the number of admissions with outlier payments increased from 46 in the base year to 287 in PY2. Even though Somerset's number of admissions with an outlier payment fell in PY3, it still had the largest change between the base year and PY3 (also see ***Figure 8-2***). We have been unable to ascertain whether this was due to larger increases in charges at Somerset than other hospitals, an unusually high rate of high risk patients for Somerset, or some other factor such as a change in coding practices. The average share of admissions with cost outliers in participating hospitals in PY3 was 1.66 percent, an increase of 0.29 percentage points from the base year. This was a slightly higher than the average 0.28 percentage point increase at the comparison hospitals. Aside from Somerset, annual changes in the share of admissions with outlier payments were small for all but two other participating hospitals. The two exceptions were Hunterdon and Atlanticare where there were large annual changes (Figure 8-2).

***Market Analysis— Severity of Admission*:** One reason that some hospitals may have more cost outliers may relate to a higher severity of admission. To measure patient severity, we used the

Figure 8-2
Share of admissions with a cost outlier



NOTE: An inpatient admission was deemed a cost outlier if an outlier payment was present on the claim.

SOURCE: RTI processing of Medicare claims.

classification system developed by 3M® as part of their All-Patient Refined DRG (APR-DRG®) grouping of patients (Averill, 1995). The goal of the APR-DRG was to create a more refined measure of patient severity than existed in Medicare's original DRG system through more accurately identifying the severity of certain medical complications and how they might interact to increase a patient's overall severity level.

The APR-DRG severity of illness classification is designed to capture the extent of physiologic decompensation or organ system loss of function.[24] Each patient is first classified in an APR-DRG according to their principal diagnosis or procedure (e.g., cardiac valve procedure with catheterization; angina). All secondary diagnoses are then assigned to one of four groups: minor, moderate, major, extreme. For example, the severity level for respiratory diagnoses progresses from bronchitis (minor), to asthma with status asthmaticus (moderate), to viral pneumonia (major), and finally to respiratory failure (extreme). Next, the algorithm adjusts upwards the base classification of secondary diagnoses for more "severe" APR-DRGs (e.g., bypass) and computes the base severity level as the maximum level of any secondary diagnosis. Finally, the system reserves the major and extreme severity classes to patients with multiple major or extreme co-morbid diagnoses. Requiring multiple serious complications to be classified in the major/extreme categories avoids classifying all patients in a "serious" APR-DRG (e.g., bypass, hip fracture) at the top levels of severity.

Table 8-4 compares the percent of admissions classified with an APR severity index of major or extreme at demonstration and comparison hospitals in base year and PY3. It is not surprising that there is variation in severity across hospitals, but the range in this variation is small. The share of major or extreme severity admissions at participating hospitals averaged 33.7 percent during the base year and ranged from a low of 30 percent at Monmouth Medical Center to a high of 38.3 percent at Overlook Hospital. The percent of major or extreme severity admissions at the comparison hospitals was 33.2 percent in base year.

Of interest, however, is the change in percent of admissions classified as either major or extreme severity One potential concern associated with the gainsharing model is the possibility that physicians who have admitting privileges in multiple hospitals might be incentivized to refer their more severe cases to other non-gainsharing hospitals. If this occurred, we would expect to see a smaller increase or a decline in major or extreme cases at participating hospitals between the base and intervention year relative to the comparison hospitals.

By PY3, the range of major/extreme shares increased among the participating hospitals—from 36 percent (Valley) to 51.8 (Jersey Shore). Two participating hospitals had lower major/extreme shares than the comparison hospitals' PY3 average of 41.8 percent. Among the comparison hospitals there was an 8.6 percentage point increase in the percent of admissions

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[24] Risk of mortality, the other dimension, captures differential risks of dying. Because so few hospital patients die during their inpatient admission, we believe that 3M's severity of illness classification is better suited to measure severity differences in referral patterns. 3M also has developed relative cost weights for all the APR-DRGs and their 4 severity levels. We investigated their use but found that they "overstate" the severity of patients who are undergoing expensive, but not necessarily "risky" or "severe" procedures (e.g., PTCA).

Table 8-4
Base year and Year 3 inpatient admissions: percent major or extreme severity,[1] participating and comparison hospitals

Hospital	Percent major or extreme severity		Year 3 minus base year
	Base year	Year 3	
Hunterdon Medical Center	33.4	50.8	17.4
Holy Name Hospital	31.9	42.0	10.0
Valley Hospital	31.4	36.0	4.7
St. Francis Medical Center	32.1	45.9	13.7
Our Lady of Lourdes Medical Center	36.2	51.6	15.4
Somerset Medical Center	33.5	48.2	14.8
Overlook Hospital	38.3	50.7	12.5
Atlanticare Regional Medical Center	36.0	43.5	7.6
Jersey Shore University Medical Center	34.8	51.8	17.0
Monmouth Medical Center	30.0	42.6	12.6
JFK Medical Center	32.9	41.0	8.1
Centrastate Medical Center	31.6	48.0	16.4
Comparison Hospitals	33.2	41.8	8.6

NOTE:

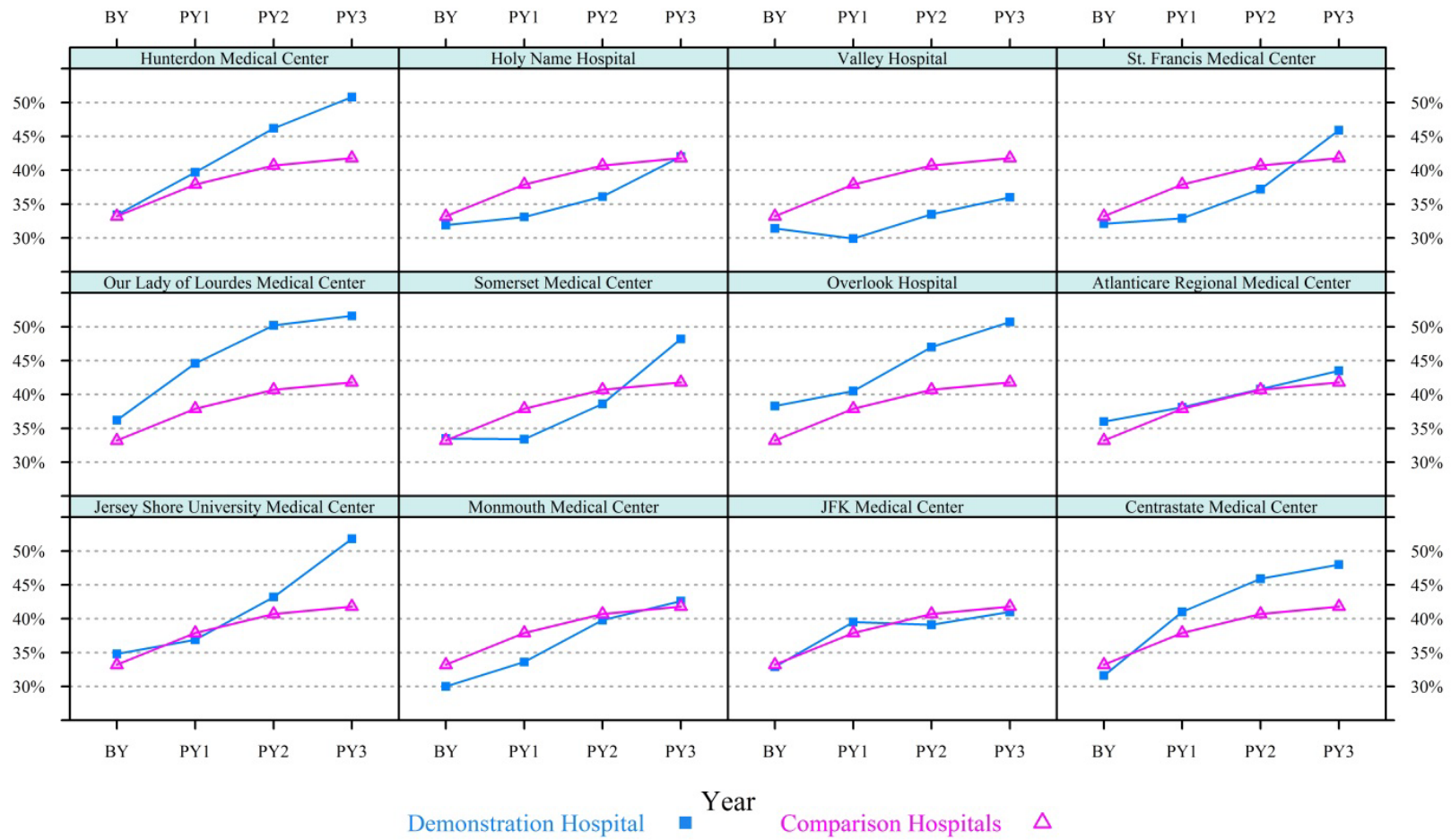
[1] Percentage based on claims grouped by the 3M® APR-DRG grouper and the resulting severity classification.

SOURCE: RTI Analysis of Medicare Claims

considered major or severe. Among the participating hospitals, nine of the 12 participating hospitals had larger increases. The remaining three participating hospitals also had increases in the severity of their admissions. On average the share of major or extreme admissions increased 11.5 percentage points at the participating hospitals. Aside from JFK Medical Center, Valley Hospital, and Somerset Medical Center there was a steady increase in the share of major/extreme admissions at participating hospitals (***Figure 8-3***).[25]

[25] Nationally, there was an increase in outpatient observation stays between 2006 and 2012. MedPAC concluded that this increase only partially explained the decrease in inpatient admissions (MedPAC, Report to the Congress, Medicare Payment Policy, March 2014, p. 57). The observation stays, however, might partially explain the increase in the share of major/extreme severity inpatient admissions in New Jersey hospitals. That is, observation stays are probably less complex than routine admissions.

Figure 8-3
Share of admissions classified as major or extreme severity



NOTE: Percentage based on claims grouped by the 3M® APR-DRG grouper and the resulting severity classification.

SOURCE: RTI processing of Medicare claims.

Physician Referral Patterns: As part of the demonstration, the participating sites may have the incentive to avoid potentially high cost admissions. Patients with APR-DRG severity scores that are major or extreme, potential cost outliers, or patients that are admitted through the emergency room are all potentially high cost. However, the hospitals' ability to steer high cost patients to another facility are limited unless specialized tertiary care is provided at the destination hospital. Physicians are instrumental in which patients are admitted to a particular hospital. Physicians often have admitting privileges at multiple hospitals and can often steer or refer a patient to one hospital.

Unlike current Medicare payment models where hospitals and physicians are reimbursed separately, in this demonstration an internal facility cost saving component (i.e., the gainsharing payment) is shared between the physician and hospitals. Consequently, physician financial incentives may be more aligned with hospital financial incentives to avoid potentially high cost patients or to transfer high cost patients once they are admitted. In this section, we conduct an analysis of physician referral patterns.

Physician Referral—Admission Patterns: Physicians are instrumental in deciding which patients are admitted to a particular hospital. Physicians often have admitting privileges at multiple hospitals and can often steer or refer a patient to one hospital over another regardless of the cost to the hospital or patient. Physicians who admit at other hospitals have increased ability to steer potentially costlier patients prior to admission.

To gauge the number of acute care hospitals to which participating physicians may have admitting privileges, we looked at all eligible base year and PY3 inpatient claims in New Jersey, and the neighboring states of New York, Pennsylvania, and Delaware. From this analysis we were able to determine the number of physicians at each hospital who, based on Medicare claims, were also admitting physicians at another market area hospital. ***Table 8-5*** shows the number of physicians with admissions at both a participating demonstration hospital and another market area acute care hospital. The first column shows the participating hospitals. The next two columns of Table 8-5 show the number of physicians who admitted a patient at the demonstration participating hospitals in the base year and PY3, respectively. The fourth and fifth columns show the number of gainsharing admitting physicians at particular demonstration hospital who also admitted at a comparison hospital in the base year and PY3, respectively. The last two columns show the number of participating physicians admitted patients at the demonstration hospital and who admitted at another acute care hospital that was neither a participating nor comparison hospital in the base year and PY3, respectively.

The number of admitting (responsible) physicians at participating hospitals changed between the base year and PY3. Some of the changes were small. Others were large (Holy Name Hospital).

Table 8-5
Number of participating physicians who admitted at a demonstration hospital and also at a comparison or other acute care hospital

	Demonstration Hospital		Also at comparison		Also at another hospital	
Demonstration hospital	Base year	PY 3	Base year	PY 3	Base year	PY 3
Hunterdon Medical Center	98	103	6	6	7	7
Holy Name Hospital	250	304	133	172	47	67
Valley Hospital	438	425	120	64	97	62
St. Francis Medical Center	125	119	61	61	86	92
Our Lady of Lourdes Medical Center	151	182	56	55	93	84
Somerset Medical Center	225	243	19	13	42	24
Overlook Hospital	328	354	16	15	144	139
Atlanticare Regional Medical Center	169	202	37	52	33	38
Jersey Shore University Medical Center	304	349	6	11	122	135
Monmouth Medical Center	188	178	4	6	44	60
JFK Medical Center	382	371	102	89	195	119
Centrastate Medical Center	180	188	15	19	40	38

SOURCE: RTI analysis of Medicare claims.

The number of physicians who admitted patients at a participating hospital and at a comparison hospital is shown in the fourth and fifth columns of Table 8-5. The range is large with six hospitals having had 20 or fewer physicians who admitted at a comparison hospital. On the other hand, there were three hospitals that had 100 or more physicians who admitted at a comparison hospital. The large range is due, in part, to whether a comparison hospital was near a participating hospital.

The number of physicians who admitted patients at a participating hospital and at another hospital, other than a comparison hospital or another participating hospital, is shown in the last two columns of Table 8-5. The range is large with Hunterdon having had fewer than ten physicians who admitted at another hospital. On the other hand, there were three hospitals that had 100 or more physicians who admitted at another hospital.

Overall, with the exception of Hunterdon Medical Center, many physicians who admitted patients at a participating hospital also admitted patients at other hospitals. This variation may be important because hospitals where a larger proportion of physicians also admit at other hospitals may have an increased ability to steer potentially most costly patients to non-gainsharing facilities. Three of the participating hospitals had large changes in the number of their physicians who admitted at other hospitals. The number of Holy Name Hospital physicians who admitted at a comparison hospital increased from 133 to 172 between the base year and PY3. By comparison, the number of Valley Hospital and JFK Medical Center physicians who admitted elsewhere fell considerably.

Physician Referral—Transfer Analysis*:* While physicians with admitting privileges at multiple hospitals may be able to steer patients to one hospital over another, they may have limited ability to steer patients that are seen in an emergency room to another hospital for any required admissions. However, once admitted to a demonstration hospital, participating gainsharing physicians may have an incentive either to transfer very costly patients to other acute care hospitals (IPPS transfers) or to PAC providers.

To test this hypothesis, we calculated the share of demonstration admissions that were transferred to another facility as well as the share of transfers that were major or extreme severity cases. We then compared the change in major or extreme severity cases transferred from demonstration hospitals between base year and PY3 for demonstration and comparison hospitals. We defined a transfer from a short-term acute-care hospitals to another facility as any two claims for the same patient in which: (1) the admission date of the second claim was within one day of the discharge of the first claim; and, (2) the two provider ID's did not match, (i.e., not a readmit to the same hospital). We chose this definition because it does not rely on the discharge destination reported on the claim but rather on what actually appeared in the claims history file.

Table 8-6 shows transfer rates of discharges from participating and comparison hospitals in the base year and PY3. Total transfer rates (to all sources, including other short-term acute care hospitals and PAC providers) in the base year ranged from a low of 20.1 percent of discharges at Our Lady of Lourdes Medical Center to 33.8 percent at Centrastate Medical Center. Average total transfers for the comparison hospitals were 30.4 percent in the base year. By PY3, total transfers increased at all participating hospitals. In contrast, the total transfer rate for the comparison hospitals increased only 2.3 percentage points between the base year and PY3 (from 30.4 to 32.7

percent). With a change of 11.2 percentage points, JFK Medical Center had the largest change between the base year and PY3 with most of the change occurring between the base year and PY1 (***Figure 8-4***).

Table 8-6
Base year and year 3 transfer rates of discharges from participating and comparison hospitals

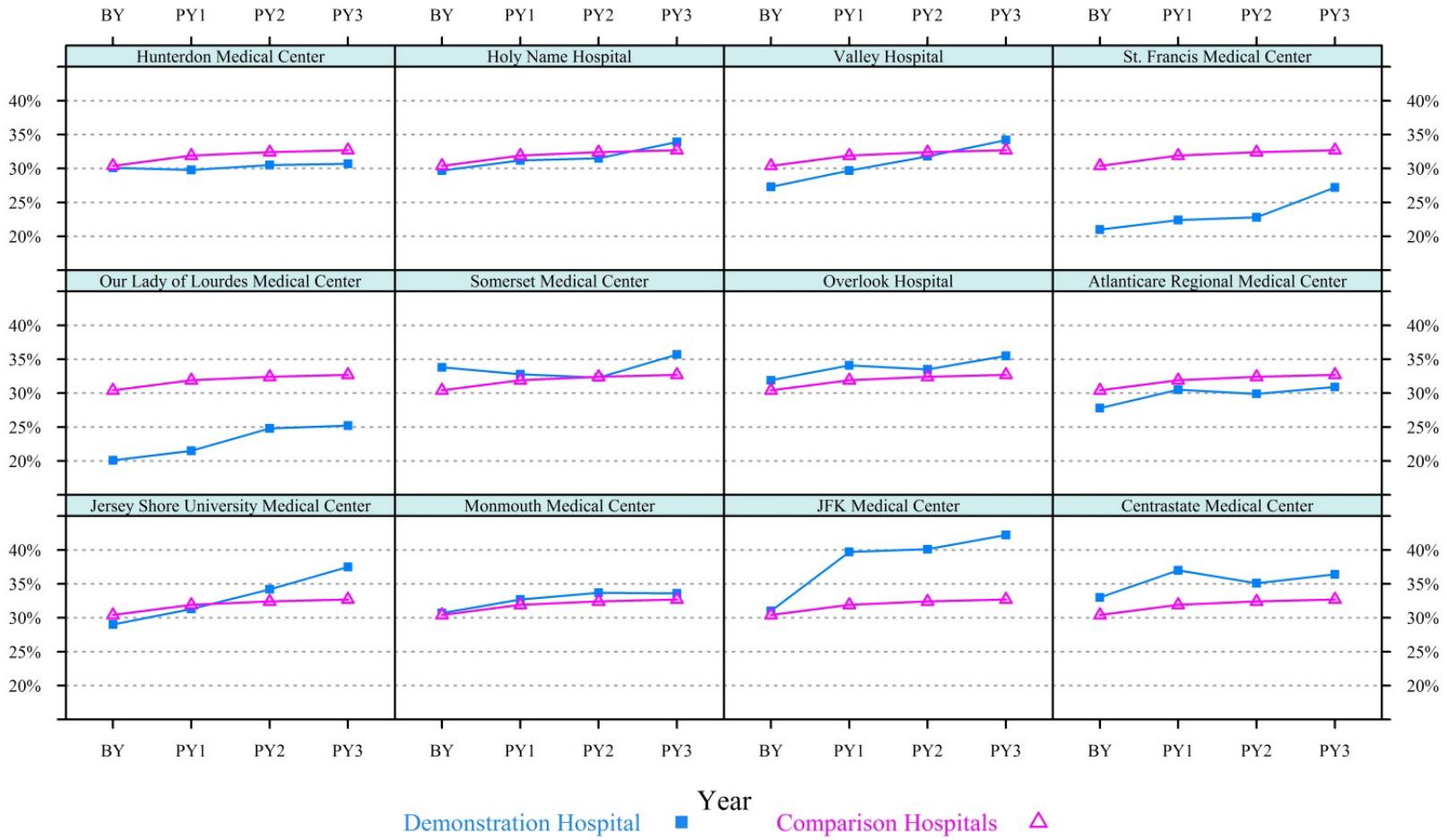
Hospital	Percent of total discharges transferred		Year 3 minus base year	Percent transferred to another short-term acute-care hospital		Year 3 minus base year
	Base year	Year 3		Base year	Year 3	
Hunterdon Medical Center	30.1	30.7	0.6	3.7	3.4	-0.3
Holy Name Hospital	29.7	33.9	4.2	2.6	2.0	-0.6
Valley Hospital	27.3	34.2	6.9	0.6	0.9	0.3
St. Francis Medical Center	21.0	27.2	6.2	1.3	1.7	0.4
Our Lady of Lourdes Medical Center	20.1	25.2	5.1	0.7	1.2	0.5
Somerset Medical Center	33.8	35.7	1.9	2.0	2.0	0.0
Overlook Hospital	31.9	35.5	3.6	2.8	1.8	-1.0
Atlanticare Regional Medical Center	27.8	30.9	3.1	1.3	0.9	-0.4
Jersey Shore University Medical Center	29.0	37.5	8.5	0.6	0.7	0.1
Monmouth Medical Center	30.7	33.6	2.9	2.6	3.7	1.1
JFK Medical Center	31.0	42.2	11.2	3.7	2.8	-0.9
Centrastate Medical Center	33.0	36.4	3.4	3.7	4.6	0.9
Comparison Hospitals	30.4	32.7	2.3	3.0	2.5	-0.5

NOTES: Total transfers include transfers to another acute care hospital, SNF, Long term care facility, and other non-IPPS hospitals. It excludes discharges to home health. Percentage change is equal to the Year 2 value minus the Base Year value.

SOURCE: RTI analysis of Medicare Inpatient Claims.

Transfers to another short-term acute-care hospital in base year ranged from less than one percent at Valley Hospital, Jersey Shore University Medical Center, and Our Lady of Lourdes Medical Center to 3.7 percent at Hunterdon, JFK, and Centrastate Medical Center (***Table 8-6***). Transfers specifically to short-term acute-care hospitals also increased for demonstration hospitals, with the exceptions of Hunterdon Medical Center, Holy Name Hospital, Overlook Hospital, Atlanticare Regional Medical Center, and JFK Medical Center. By comparison, transfers to another short-term acute-care hospital from comparison hospitals decreased 0.5 percentage point (from 3.0 to 2.5 percent) between the base year and PY3. As can be seen in ***Figure 8-5***, the largest changes were for Monmouth Medical Center and Centrastate Medical Center.

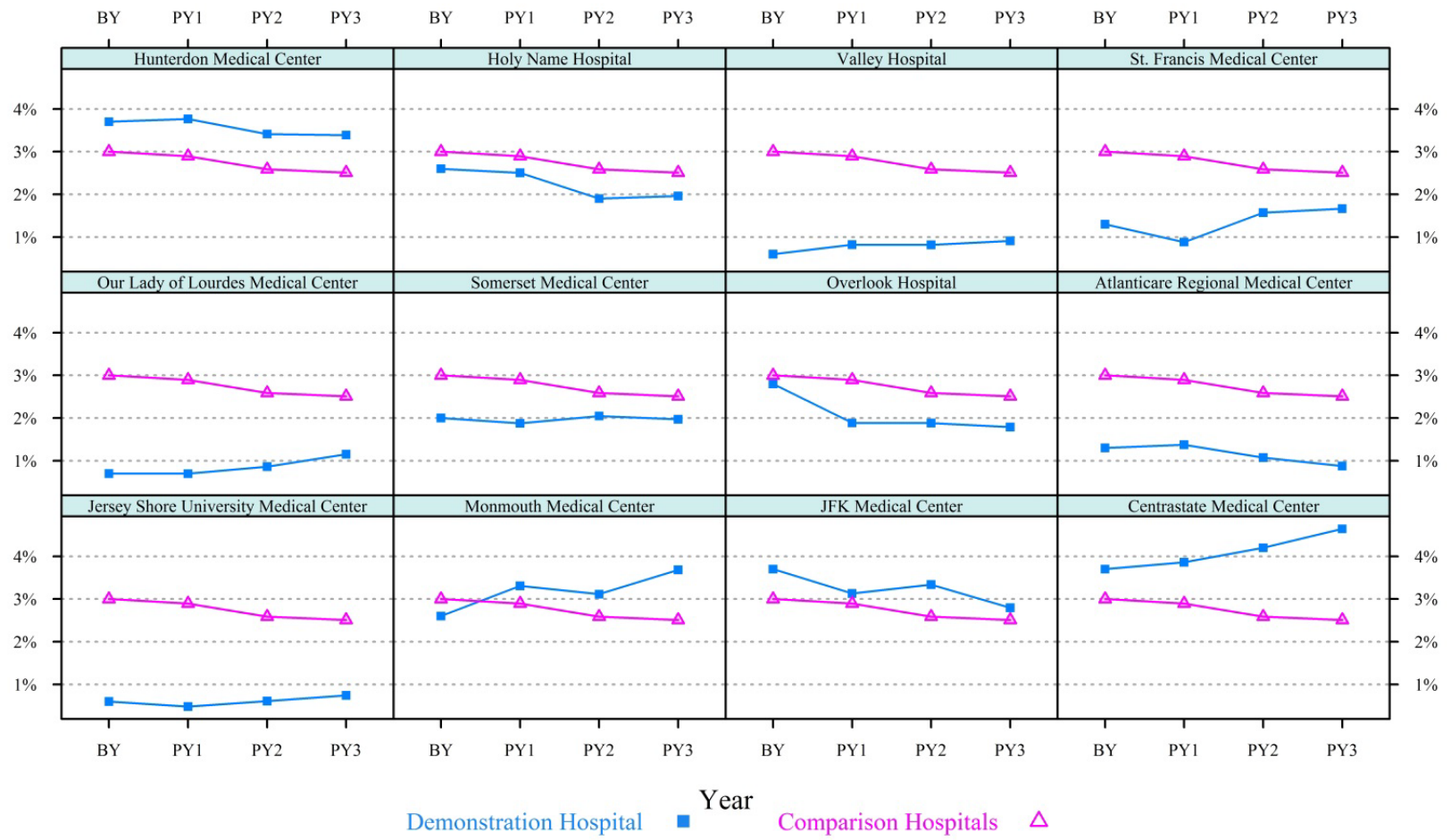
Figure 8-4
Total transfer rate



NOTE: Total transfers include transfers to another acute care hospital, SNF, Long term care facility, and other non-IPPS hospitals. It excludes discharges to home health.

SOURCE: RTI processing of Medicare claims.

Figure 8-5
Transfer rates from participating and comparison hospitals to short-term acute-care hospitals



NOTE: Percentage based on claims grouped by the 3M® APR-DRG grouper and the resulting severity classification.

SOURCE: RTI processing of Medicare claims.

These results can be difficult to interpret. Descriptive findings alone are insufficient to determine whether transfers increased among physicians practicing at demonstration hospitals specifically in response to incentive payments. To consider this question further, we analyzed the correlations between average physician incentive payments in Table 8-1 and transfer rates in Table 8-6. Physicians with access to increased incentive payments may have a greater incentive to change their admitting behavior, including directing a higher rate of transfer patients. We did not find any correlation. There are many factors that influence physician decisions to transfer patients, including the severity of the admission, the hospital's ability to care for very severe admissions, and availability of other hospitals to transfer patients to. Part of the reason for not finding a correlation is because many physicians who admit at participating hospitals did not participate in the gainsharing demonstration while the data used in the analyses are based on all claims, not just those from participating physicians.[26]

Another variant on our transfer analysis relates specifically to incentives to avoid, through transfers, sicker, more acute care patients. Under the gainsharing methodology, participating physicians may have an increased incentive to transfer sicker patients. To test this hypothesis, we examined the share of transfers from demonstration hospitals for admissions with an APR severity index of major or extreme. ***Table 8-7*** shows the percent of base year and PY3 transfers to another acute care hospital that were classified as major/extreme severity.

In the base year, the fraction of transfers to another acute care hospital with an APR severity index of major or extreme ranged from 22.4 percent at Valley Hospital to 58.4 percent at Atlanticare Regional Medical Center. Seven of the participating hospitals had higher rates than the average 36.4 percent for the comparison hospitals. The percent of transfers major or extreme increased between the base year and PY3 at all participating hospitals. In addition, seven of the participating hospitals had larger increases than the average 10.4 percentage point increase for the comparison hospitals. As can be seen in ***Figure 8-6***, the increase between PY2 and PY3 accounted for most of increase for the three participating hospitals with the largest increases: Hunterdon, St. Francis, and Jersey Shore.

[26] RTI does not have the UPINs or NPIs of the physicians who are actually eligible for gainsharing incentive payments.

Table 8-7
Base year and Year 3 transfers to acute care hospitals – percent major or extreme severity[1], participating and comparison hospitals

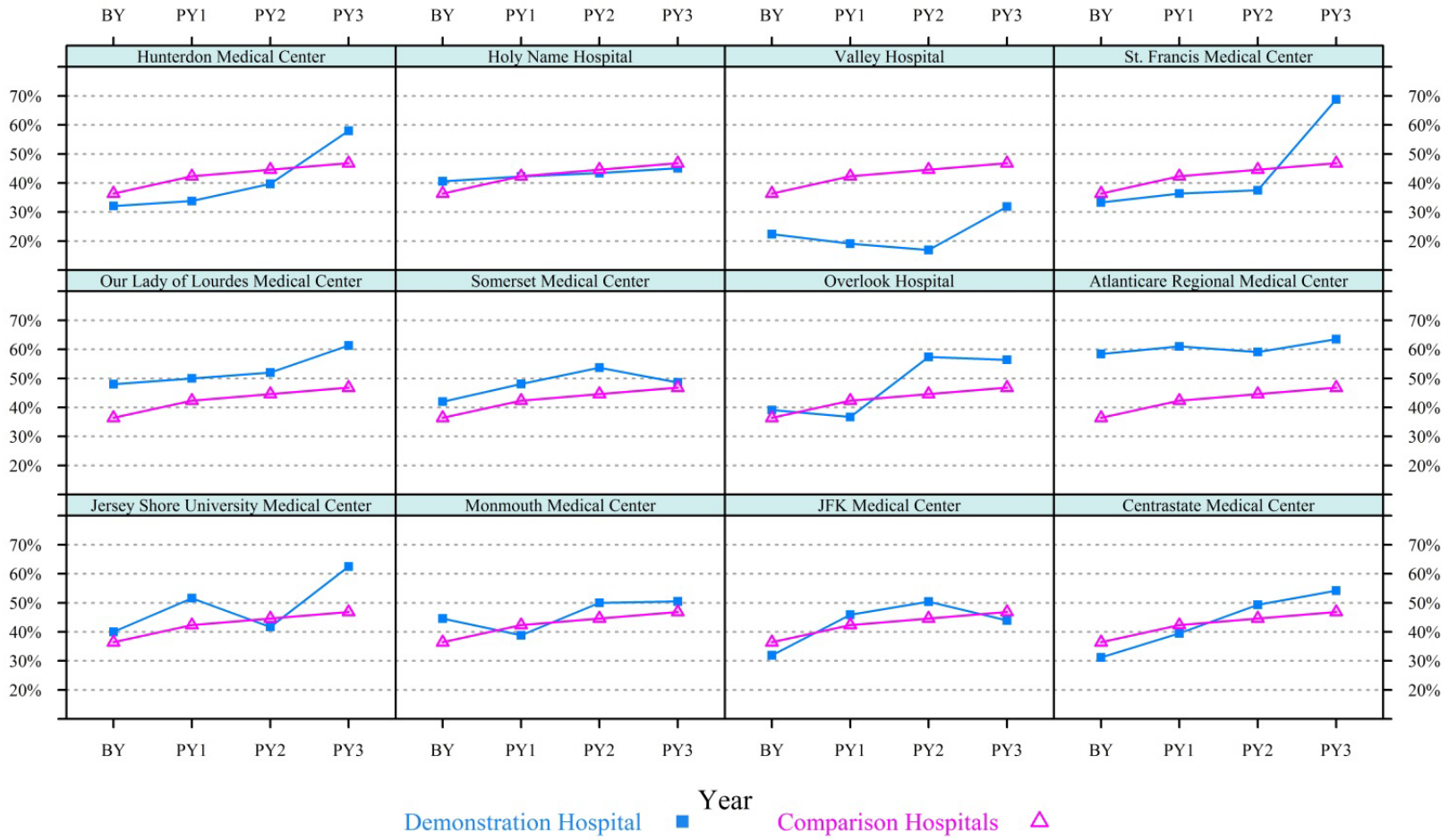
Hospital	Percent of transfers major or extreme severity		Year 3 minus base year
	Base year	Year 3	
Hunterdon Medical Center	32.1	58.0	25.9
Holy Name Hospital	40.6	45.1	4.5
Valley Hospital	22.4	31.9	9.5
St. Francis Medical Center	33.3	68.8	35.5
Our Lady of Lourdes Medical Center	48.0	61.3	13.3
Somerset Medical Center	42.0	48.6	6.6
Overlook Hospital	39.1	56.4	17.3
Atlanticare Regional Medical Center	58.4	63.5	5.1
Jersey Shore University Medical Center	40.0	62.5	22.5
Monmouth Medical Center	44.6	50.5	5.9
JFK Medical Center	31.9	43.9	12.0
Centrastate Medical Center	31.2	54.2	23.0
Comparison Hospitals	36.4	46.8	10.4

NOTE:

[1] Percentage based on claims classified as major or extreme severity by the 3M® APR-DRG grouper.

SOURCE: 3M® APR-DRG grouper and RTI analysis of Medicare Claims

Figure 8-6
Share of transfers that were classified major or extreme severity, from participating and comparison hospitals, to short-term acute-care hospitals



NOTES: Percentage based on claims grouped by the 3M® APR-DRG grouper and the resulting severity classification.

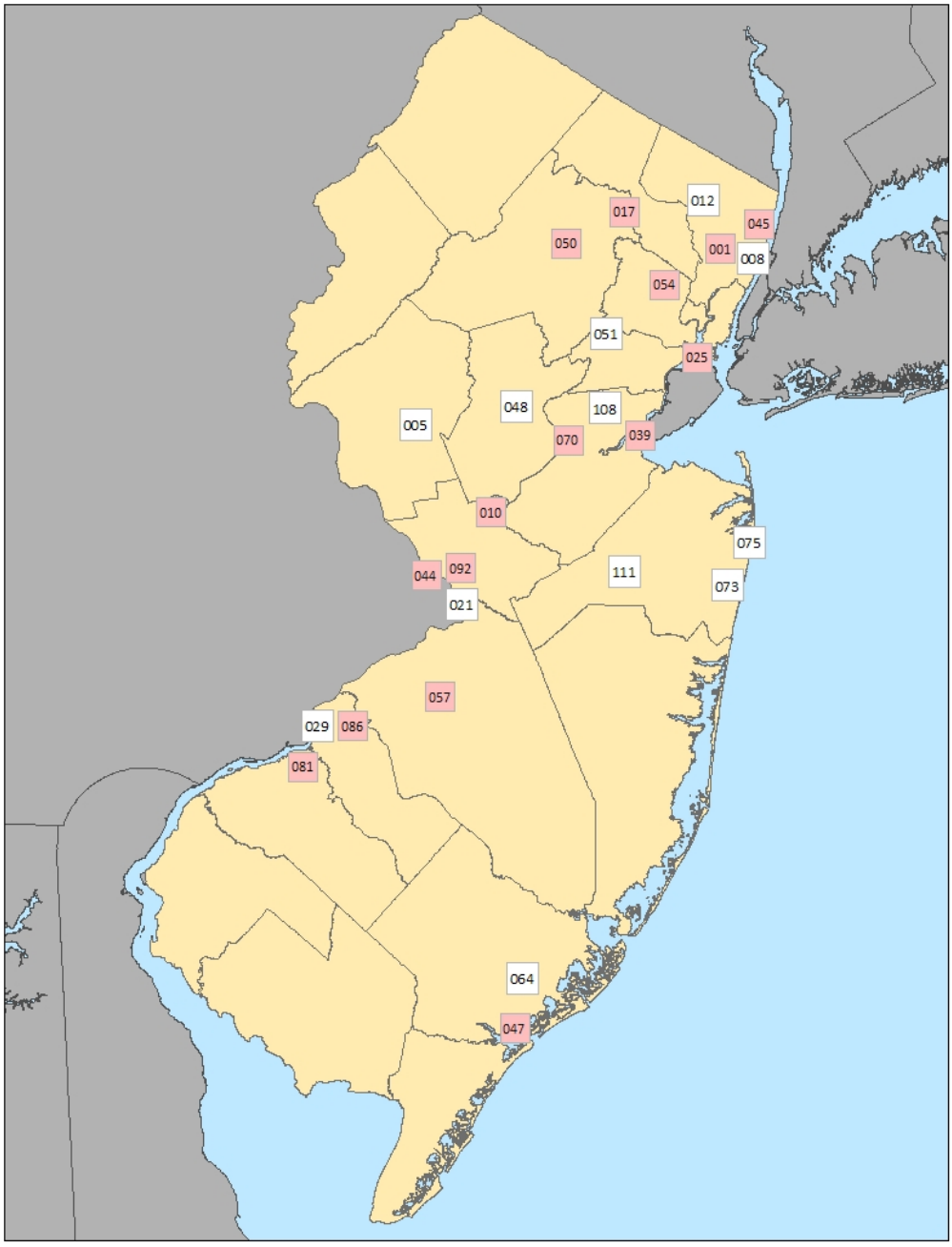
SOURCE: RTI processing of Medicare claims.

Physician Referral—Overlap between Participating and Comparison Hospitals: The map in ***Figure 8-7*** shows the location of the participating and comparison hospitals. Given the geographic proximity of some of the participating sites to comparison hospitals, there is at least a practical feasibility that physicians at participating hospitals are also admitting at comparison hospitals. In Table 8-5, we saw that the same physicians were admitting at both participating and comparison hospitals. To the extent that the same physicians are admitting patients at both a participant and a comparison hospital, a potential bias in resulting analyses may be created, making the cost savings appear greater if participating physicians admit their sicker more costly patients to comparison hospitals. Alternatively, there could also be a negative bias, underestimating cost savings, if participating physicians' new more efficient behavior spills over to the comparison hospitals. In this section, we investigate the overlap in physicians between participating and comparison hospitals more closely. ***Table 8-8*** shows the number of physicians with admissions at both demonstration and comparison hospitals during PY3. ***Table 8-9*** shows show the number of eligible admissions for physicians for that same set of physicians during PY3.

Several demonstration hospitals have large numbers of physicians who also had eligible admissions at comparison sites. In the Northeast corner of New Jersey, gainsharing physicians at Holy Name Hospital and Valley Hospital also admitted patients at Hackensack University Hospital and Englewood Hospital Medical Center. Gainsharing physicians at Holy Name Hospital had 1,489 admissions at Hackensack University Hospital and1,335 eligible admissions at Englewood Hospital Medical Center for a combined total of 2,824 in PY3 (which is much higher than the base year 1,759 combined admissions). On the other hand, gainsharing physicians at Valley Hospital had 411 eligible admissions at Hackensack University and 122 admissions at Englewood for a combined total of 533 (lower than the combined 1,027 during the base year). The PY3 values for Holy Name and Valley are lower than their PY1 values.

In the Southeastern corner of New Jersey, 36 physicians at Atlanticare Regional Medical Center had 705 eligible admissions at Shore Memorial Hospital during PY3, down from the 927 in the base year and 771 in PY1. In the Philadelphia area, physicians at Our Lady of Lourdes Medical Center had a combined 838 admissions at Underwood Memorial Hospital and Kennedy Memorial Hospitals – University Medical Center, down from the 1,316 in PY1 and the 1,023 during the base year. Another large overlap was in the middle of the State between JFK Medical Center and Raritan Bay Medical Center where 78 physicians at JFK had 951 eligible admissions at Raritan Bay during PY3, down from the 1,400 during the base year and the 1,101 in PY1.

Figure 8-7
Participating hospitals in the NJ Gainsharing Demonstration and their comparison hospitals



NOTE: Numbers (IDs) inside the boxes are the last three numbers of the CMS Certification Numbers of the participating and comparison hospitals. The IDs for participating hospitals are in boxes with a white (transparent) background—see Table 3-1 for their names. The IDs for comparison hospitals are in boxes with a rose background—see Table 3-3 for their names.

Table 8-8
Number of year three physicians who admitted at a participating hospital and a comparison hospital

Hospital	Hackensack University Medical Center	University Medical Center at Princeton	Chilton Memorial Hospital	Bayonne Hospital Center	Raritan Bay Medical Center	Capital Health System-Mercer Campus	Englewood Hospital and Medical Center	Shore Memorial Hospital	Saint Clare's Hospital	Mountainside Hospital	Virtua Memorial Hospital of Burlington County	Saint Peter's University Hospital	Underwood Memorial Hospital	Kennedy Memorial Hospitals-University Med Center	Capital Health System-Fuld Campus
Hunterdon Medical Center	0	5	0	0	0	2	0	0	0	0	0	1	0	0	2
Holy Name Hospital	74	0	0	0	0	0	103	0	0	0	0	1	0	0	0
Valley Hospital	34	0	12	0	0	0	14	0	0	3	0	0	0	0	0
St. Francis Medical Center	0	15	0	0	0	37	0	0	0	0	0	0	0	0	34
Our Lady of Lourdes Medical Center	0	0	0	0	0	1	0	0	0	0	5	1	22	22	1
Somerset Medical Center	0	2	0	0	1	0	0	0	0	0	0	9	0	0	0
Overlook Hospital	0	1	1	3	1	0	1	0	1	4	0	3	0	0	0
Atlanticare Regional Medical Center	0	0	2	1	1	0	0	36	0	0	5	1	0	4	0
Jersey Shore University Medical Center	0	0	0	0	4	0	1	0	0	0	0	6	0	0	0
Monmouth Medical Center	2	1	1	0	1	0	0	0	0	0	0	0	0	0	0
JFK Medical Center	1	0	0	1	78	0	0	0	0	0	0	11	0	0	0
Centrastate Medical Center	0	1	0	0	12	0	0	0	1	0	0	4	0	0	1

SOURCE: RTI Analysis of Medicare claims and 2013 National Provider Identifier database.

Table 8-9
Number of third year admissions for physicians who admitted at a participating and a comparison hospital

Hospital	Hackensack University Medical Center	University Medical Center at Princeton	Chilton Memorial Hospital	Bayonne Hospital Center	Raritan Bay Medical Center	Capital Health System-Mercer Campus	Englewood Hospital and Medical Center	Shore Memorial Hospital	Saint Clare's Hospital	Mountainside Hospital	Virtua Memorial Hospital of Burlington County	Saint Peter's University Hospital	Underwood Memorial Hospital	Kennedy Memorial Hospitals-University Med Center	Capital Health System-Fuld Campus
Hunterdon Medical Center	0	42	0	0	0	6	0	0	0	0	0	2	0	0	2
Holy Name Hospital	1489	0	0	0	0	0	1335	0	0	0	0	3	0	0	0
Valley Hospital	411	0	99	0	0	0	122	0	0	6	0	0	0	0	0
St. Francis Medical Center	0	71	0	0	0	277	0	0	0	0	0	0	0	0	214
Our Lady of Lourdes Medical Center	0	0	0	0	0	1	0	0	0	0	23	6	196	642	9
Somerset Medical Center	0	3	0	0	3	0	0	0	0	0	0	73	0	0	0
Overlook Hospital	0	1	4	22	9	0	4	0	3	8	0	7	0	0	0
Atlanticare Regional Medical Center	0	0	17	4	11	0	0	705	0	0	221	1	0	50	0
Jersey Shore University Medical Center	0	0	0	0	51	0	4	0	0	0	0	21	0	0	0
Monmouth Medical Center	39	122	9	0	1	0	0	0	0	0	0	0	0	0	0
JFK Medical Center	13	0	0	9	951	0	0	0	0	0	0	75	0	0	0
Centrastate Medical Center	0	22	0	0	66	0	0	0	15	0	0	51	0	0	7

SOURCE: RTI analysis of Medicare claims and 2013 National Provider Identifier database.

Overall, of the 46,549 eligible admissions at the comparison hospitals during PY3, 7,558 or 16.2 percent are attributed to physicians with eligible admissions at demonstration participating hospitals. While this PY3 share is higher than the base year share, it is also 1.5 percentage points lower than the peak value of 17.8 percent during PY1. Nonetheless, this considerable level of admitting privileges overlap raises the possibility that physicians may have both an incentive and an ability to steer more costly and complex patients away from demonstration participating hospitals to another hospital.

8.4 Multivariate Results

This section reports the results of the multivariate analyses on the severity of admissions and IPPS transfers. Two models were estimated for each outcome variable:

- **Model 1** consisting of hospital characteristics as well as the 2D components (participating hospital indicator, time period indicator(s), and the 2D estimator(s)), and
- **Model 2** which includes patient characteristics as well as the other Model 1 variables.

Three types of 2D forms were estimated for each of the two above models:

1. Basic DID model in which there is one demonstration-period indicator.
2. A time trend model in which time is measured as 0, 1, 2, and 3 (the base period has a value of zero and the three performance periods have, respectively, values 1, 2, and 3).
3. A year-specific model in which there is a separate time-period indicator for each of the performance years.

Only the parameter estimates for the 2D components are presented in this section's tables. Appendix tables show the full regression results for each estimated model.

Severity of Admission: In ***Table 8-4***, we presented descriptive results that showed all of the participating hospitals had an increase in admissions classified as major or extreme severity between the base year and PY3. In nine of the participating hospital increases were larger than the average increase for the comparison hospitals. We had hypothesized that physicians may have an incentive to steer more severe cases to other hospitals where they have privileges in order to increase their demonstration payments.

Table 8-10 shows the logistic parameter estimates for each of the 2D components for both Models 1 and 2. The upper panel of Table 8-10 shows the 2D parameter estimates for the basic DID form (Appendix Table 8-7 shows all parameter estimates for the basic DID form) while the lower panel shows those for the year-specific DID time-period variant (Appendix Table 8-9 shows all of the parameter estimates for the year-specific form). In the basic DID results (upper panel), the 2D estimators for both Models 1 and 2 are positive but not statistically significant.

Table 8-10
Probability that an admission has major or extreme severity, difference-in-differences (DID) estimates

	Model 1			Model 2		
	Hospital characteristics			Model 1 plus patient characteristics		
2D components	Coef.	Robust Std. Err.	P > | t |	Coef.	Robust Std. Err.	P > | t |
Basic DID (performance periods grouped together)						
Participating hospital	0.033	0.059	0.574	0.006	0.063	0.929
Demonstration period	0.301	0.042	0.000	0.281	0.036	0.000
2D estimator	0.005	0.063	0.936	0.018	0.060	0.765
pseudo R^2	0.0035	—	—	0.1396	—	—
Year-specific DID						
Participating hospital	0.033	0.059	0.579	0.005	0.063	0.934
Time period						
PY 1	0.210	0.041	0.000	0.192	0.042	0.000
PY 2	0.322	0.041	0.000	0.297	0.037	0.000
PY 3	0.375	0.057	0.000	0.359	0.043	0.000
2D estimator, year-specific						
PY 1	-0.086	0.062	0.164	-0.091	0.060	0.131
PY 2	-0.010	0.064	0.871	0.009	0.062	0.881
PY 3	0.117	0.083	0.157	0.140	0.077	0.070
pseudo R^2	0.0052	—	—	0.1412	—	—
Number of observations	404,214	—	—	404,214	—	—

NOTES: Model 1 consists of hospital characteristics plus the DID components; Model 2 consists of Model 1 plus patient characteristics; Basic DID: full regression results in Appendix Table 8-7; Year-specific DID: full regression results in Appendix Table 8-9

SOURCE: RTI processing of Medicare claims.

Runs: gain2_request1_jul09_wa055; gain2_request1_jul09_wa056

The year-specific 2D estimates (lower panel) have a different pattern from the basic DID results. In particular, even though three of the four the 2D estimates are negative in the first two performance years, they are positive in PY3 for both models 1 and 2. Not only are they positive in PY3, the estimates become progressively more positive (larger) from PY1 through PY3. However, only Model 2's PY3 2D estimate is statistically significant and, that, only at the 10 percent level. As stated in Section 8.2, Model 1 rather than Model 2 is the preferred model.

The participating hospital indicator shows that participating hospitals, during the base year, were more likely to be classified as major or extreme. However, this effect is not statistically significant. The performance period indicators are statistically significant and show that there was an increase in admissions classified as major or extreme in the comparison hospitals.[27]

Because the logistic coefficients cannot be used directly to measure the effects of each explanatory variable, they need to be transformed. As in described in ***Section 6***, simulated changes for the 2D estimates were performed. However, since the 2D estimates are not statistically significant in three of the four results presented in Table 8-10, the simulated changes were performed only for the year-specific Model 2 results. Even though Model 2 is not the preferred model, these simulations were performed for illustrative purposes.

For participating hospitals in PY1, the probability of major/extreme severity was 34.4 percent and in PY1 it was 36.4 percent, an increase of 1.9 percentage points (***Table 8-11***). For the comparison hospitals, the increase was 3.7 percentage points. The 2D estimate for PY1, then, was 1.9 percent minus 3.7 percent, or -1.8 percentage points. By PY3, however, the 2D estimate was 2.9 percentage points. That is, between the base year and PY3, the share of major/extreme severity admissions increased 2.9 percentage points more at participating hospitals than at the comparison hospitals.

IPPS Transfers: In ***Table 8-6***, we presented descriptive results that showed half of the participating hospitals had an increase in IPPS transfers to another acute care hospital between the base year and PY3. The share of IPPS transfers for the comparison hospitals, in contrast, was 0.5 percentage points lower in PY3 than in the base year. We hypothesized that physicians may have an incentive to transfer sicker patients to other hospitals where they have privileges in order to increase their demonstration payments, including patients that were classified as major or extreme severity as well as nursing home patients.

[27] Appendix Table 8-8 shows the time trend DID results for both Models 1 and 2. They are not shown here because the estimates do not indicate different results from the year-specific DID results.

Table 8-11
Year-specific estimates of difference-in-differences for major/extreme admissions with hospital and patient characteristics (based on regression results from Table 8-10, Model 2, year-specific)

New Jersey PHC Demonstration and comparison hospitals, by time period	Mean probability that INDEX admission was classified as major/extreme		Performance year minus base period	Difference in differences
	Base period	Performance year		
Performance Year 1				
PHC Demonstration Hospitals	34.4%	36.4%	1.9%	-1.8%
Comparison Hospitals	34.3%	38.0%	3.7%	—
Performance Year 2				
PHC Demonstration Hospitals	34.4%	40.4%	5.9%	0.2%
Comparison Hospitals	34.3%	40.1%	5.7%	—
Performance Year 3[c]				
PHC Demonstration Hospitals	34.4%	44.3%	9.9%	2.9%
Comparison Hospitals	34.3%	41.3%	7.0%	—

NOTES:

[a] estimate of the difference-in-differences statistically significant at the 1% level

[b] estimate of the difference-in-differences statistically significant at the 5% level

[c] estimate of the difference-in-differences statistically significant at the 10% level

SOURCE: RTI processing of Medicare claims

run: gain2_request_jul10_wa057.log

Table 8-12 shows the logistic parameter estimates for each of the 2D components for both Models 1 and 2. The upper panel of Table 8-12 shows the 2D parameter estimate for the basic DID form (Appendix Table 8-10 shows all parameter estimates for the basic DID form) while the lower panel shows those for the year-specific DID time-period variant (Appendix Table 8-12 shows all of the parameter estimates for the year-specific form). In the basic DID results (upper panel), the 2D estimators for both Models 1 and 2 are positive and are statistically significant at the 10 percent level.

Table 8-12
Probability of an IPPS transfer, difference-in-differences (DID) estimates

	Model 1			Model 2		
	Hospital characteristics			Model 1 plus patient characteristics		
2D components	Coef.	Robust Std. Err.	P > | t |	Coef.	Robust Std. Err.	P > | t |
Basic DID (performance periods grouped together)						
Participating hospital	-0.511	0.204	0.012	-0.505	0.203	0.013
Demonstration period	-0.141	0.039	0.000	-0.138	0.039	0.000
2D estimator	0.174	0.092	0.059	0.163	0.090	0.070
pseudo R^2	0.0163	—	—	0.0378	—	—
Year-specific DID						
Participating hospital	-0.511	0.204	0.012	-0.504	0.203	0.013
Time period						
PY 1	-0.033	0.049	0.496	-0.034	0.047	0.478
PY 2	-0.186	0.050	0.000	-0.182	0.052	0.000
PY 3	-0.214	0.054	0.000	-0.210	0.055	0.000
2D estimator, year-specific						
PY 1	0.038	0.093	0.684	0.035	0.092	0.707
PY 2	0.214	0.093	0.022	0.200	0.091	0.027
PY 3	0.285	0.119	0.017	0.268	0.117	0.022
pseudo R^2	0.0166	—	—	0.0381	—	—
Number of observations	404,214	—	—	404,214	—	—

NOTES: Model 1 consists of hospital characteristics plus the DID components; Model 2 consists of Model 1 plus patient characteristics; Basic DID: full regression results in Appendix Table 8-10; Year-specific DID: full regression results in Appendix Table 8-12

SOURCE: RTI processing of Medicare claims.

Runs: gain2_request1_jul09_wa055; gain2_request1_jul09_wa056

The year-specific 2D estimates (lower panel) are all positive. They are not statistically significant in PY1 but are, at the 5 percent level, for both PY2 and PY3. The estimates become progressively more positive (larger) from PY1 through PY3. The participating hospital indicator shows that participating hospitals, during the base year, were less likely to transfer patients. The performance period indicators are all positive and statistically significant and show that there was a decrease in transfers in the comparison hospitals.[28]

As before, simulated changes for the 2D estimates were performed. The simulation was based on Model 1 results because 2D parameter estimates were statistically significant and because it is our preferred model.

For participating hospitals in PY1, the probability of an IPPS transfer was 1.8 percent and in PY3 it was also 1.8 percent, a change of 0 (zero) percentage points (***Table 8-13***). For the comparison hospitals, there was a small decline of 0.1 percentage points. The 2D estimate for PY1, then, was 0 percent minus -0.1 percent, or 0.1 percentage points. By PY3, however, the 2D estimate was 0.7 percentage points. That is, between the base year and PY3, the share of major/extreme severity admissions increased 0.7 percentage points more at participating hospitals than at the comparison hospitals. As can be seen in Table 8-13, the IPPS transfer rate did not markedly increase for the participating hospitals. However, the IPPS transfer rate continually fell for the comparison hospitals.

8.5 Discussion

As part of the demonstration, physicians practicing at demonstration participating hospitals had an increased financial incentive to avoid potentially high cost admissions. In this section, we conducted a market analysis of demonstration and comparison hospitals. We analyzed admitting patterns for physicians admitting at both demonstration and comparison hospitals. We found a wide variation among the demonstration hospitals in their rates of admissions through the emergency room, outlier rate, severity of admissions, and transfer patterns. In our analysis of physician referral patterns, we found that a large number of physicians at demonstration hospitals also admitted at another acute care hospitals suggesting at least the possibility that physicians may have some ability to shift high cost patients away from demonstration hospitals. However, we did not find a direct relationship between transfer rates and physician incentive payments. [29]

[28] Appendix Table 8-11 shows the time trend DID results for both Models 1 and 2. They are not shown here because the estimates do not indicate different results from the year-specific DID results.

[29] As noted earlier, we do not know the identity of the physicians, at each PHC participating hospital, who actually participated in the demonstration. Few, if any, PHC hospitals had their entire medical staff participate in the demonstration.

Table 8-13
Year-specific estimates of difference-in-differences for IPPS transfers (based on regression results from Table 8-12, Model 1, year-specific)

New Jersey PHC Demonstration and comparison hospitals, by time period	Mean probability that INDEX admission was classified as major/extreme		Performance year minus base period	Difference in differences
	Base period	Performance year		
Performance Year 1				
PHC Demonstration Hospitals	1.8%	1.8%	0.0%	0.1%
Comparison Hospitals	3.0%	2.9%	-0.1%	—
Performance Year 2[b]				
PHC Demonstration Hospitals	1.8%	1.9%	0.1%	0.5%
Comparison Hospitals	3.0%	2.5%	-0.5%	—
Performance Year 3[b]				
PHC Demonstration Hospitals	1.8%	2.0%	0.1%	0.7%
Comparison Hospitals	3.0%	2.4%	-0.6%	—

NOTES:

[a] estimate of the difference-in-differences statistically significant at the 1% level

[b] estimate of the difference-in-differences statistically significant at the 5% level

[c] estimate of the difference-in-differences statistically significant at the 10% level

SOURCE: RTI processing of Medicare claims

run: gain2_request_jul10_wa057.log

The multivariate analyses provided limited evidence that the demonstration affected likelihood that a physician would admit a severe case to a participating hospital. In particular, the participating hospitals might have actually slightly increased their share of admissions classified as major or extreme severity. This is the opposite of what we might have expected if PHC participating physicians were incentivized to avoid sicker patients. On the other hand, the multivariate analyses indicate that participating hospitals, as the PHC demonstration progressed, were more likely to have IPPS transfers than the comparison hospitals.

Interpretation of the results needs to take into consideration the context of the hospital industry as a whole. As previously noted, both Medicare FFS and all-payer admissions were falling nationally during the demonstration. It is possible that all New Jersey hospitals were subject to the same trends. However, while the share of IPPS transfers at the demonstration hospitals did not markedly increase, they did not decline as was the case for the comparison hospitals. It appears, then, that the PHC gainsharing incentives might have encouraged PHC hospitals to continue transferring patients as they had in the past instead of following the practice of the comparison hospitals.

Even though not all physicians at the participating hospitals participated in the demonstration, the terms and conditions for the demonstration stated that participating hospitals would be evaluated on all of their IPPS discharges. Consequently, even if the participating physicians did not engage in patient selection, there is evidence it occurred (possibly unrelated to the gainsharing initiative) at the participating hospitals as a whole, particularly with regard to transfers.

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SECTION 9
SUMMARY OF EVALUATION FINDINGS

The goal of the Physician Hospital Collaboration (PHC) demonstration was to test gainsharing strategies aimed at generating internal hospital care savings while improving the quality of care in a health delivery system. The demonstration sites implemented approaches that, when successful, better aligned physician and hospital financial incentives and ultimately leading to reductions in the overall internal hospital costs of care. The 12 PHC sites were expected, at a minimum, to maintain quality of care though an improvement in quality was projected in initial applications by the demonstration sites. Participating sites were not required to generate Medicare program savings, but they were required to maintain budget neutrality within the inpatient stay and up to 90 days beyond the acute inpatient stay. The purpose of this evaluation was to analyze the impact of the PHC demonstration gainsharing models against these goals, focusing on hospital efficiency, physician practice patterns, Medicare expenditures, quality, and beneficiary satisfaction. This final report presents findings from the three demonstration performance years relative to the baseline year.

Hospital leadership perceptions were generally positive. One element of the evaluation included two rounds of site visits with participating hospital staff and focus group discussions with physicians who elected to participate in gainsharing. Based on these site visits and focus group discussions, we noted some common themes among the organizations. Hospital leadership at most sites generally agreed that the gainsharing is a promising model, but it may not work well for all hospitals. Interpretation of the concept was initially positive, and remained so, even among sites that felt they were less successful at generating internal savings then they had anticipated.

Identifying strategies for internal savings was both an opportunity and a challenge. Our site visit discussions found that identifying opportunities for internal savings was both an opportunity for improvement, but sometimes a challenge, particularly as the demonstration matured. Reducing length of stay – a common goal at the start of the demonstration -- didn't always generate net hospital savings for all participating facilities. By the second performance year, most hospitals had added strategies that diversified savings strategies to include: more efficient use of blood products, pharmaceuticals, oxygen, laboratory testing and other services; shifting services unrelated to the acute episode to outpatient settings; and negotiated medical device pricing and streamlined vendor options for physicians.

During the second round of visits, we noted that sites varied in how they identified and monitored strategies for generating savings. A few hospitals had very specific procedures for identifying strategies to improve efficiency and generate savings. When asked, these hospitals were very specific about what activities generated savings, which were less successful, and what additional future changes were being considered. Physicians tended to be more involved in these instances. As a result, physicians from these sites were also more likely to know how savings were generated for their facility though this understanding tended to focus on what the hospital changed (rather than changes in their own practice behavior). Other sites took a more general approach to generating savings, relying on reductions in lengths of stay but without operationalizing or other specifying how to achieve these goals. These sites seemed to rely on individual physicians to move towards cost reductions and general efficiency based on the data

and performance feedback provided through gainsharing; in a sense, using the performance data as a strategy rather than a tool.

Physician engagement was difficult to achieve. Overall, across the two rounds of site visits, we noted less evidence than we expected of physicians indicating they had changed their practice patterns and behavior as a result of the gainsharing incentives. The level of physician engagement varied across sites, though it was rare for hospital leadership to report that participating physicians were as conscious of the new incentives to control costs and improve quality as they would have liked. This is consistent with our findings from the physician focus groups that only a small minority of participating physicians understood the gainsharing performance metrics against which they were judged. It was common for physicians to report that they were happy to receive an incentive payment, but rare for them to be able to clearly state what they had changed in their practice behavior to earn the check. Most physicians reported that they believed they always practiced in an efficient, high quality way and gainsharing hadn't changed the way they approached care in a major way.

The other elements of the evaluation focused on data driven analyses of the impact of gainsharing on Medicare expenditures and savings, quality of care, patient satisfaction and market impacts and physician referral patterns.

Medicare savings did not materialize. One of the goals of gainsharing was to reduce hospital's internal costs at a level sufficient to generate savings that could be shared with physicians. Hospitals achieving reduced internal hospital costs were able to share these generated savings with participating physicians. Medicare savings were not required under the demonstration, though the changes in incentives could in theory be expected to change physician behavior in ways that might reduce Medicare's outlays per episode through reduced physician Part B charges. The original proposals for the PHC participating hospitals anticipated that Medicare savings was anticipated as a spillover effect of gainsharing.

Our evaluation findings do not indicate these cost-saving changes in physician behavior for Medicare. It would appear that the PHC Demonstration, while generally producing internal savings for hospitals sufficient to pay physician incentives, did little to influence physicians' individual behavior and billing in ways that saved money for Medicare Part B. Inpatient physician spending in demonstration hospitals rose $38 more and outlier payments, $36 more relative to comparison groups. Inpatient physician payments steadily increased for the PHC hospitals but fell off for comparison hospitals between performance years 2 and 3. This is consistent with feedback from site visits indicating reductions in internal hospital costs often resulted from hospital management-initiated programs, rather than changes in physician behavior.

Increased spending for post-acute care was not observed. On a positive note, the evaluation found no significant evidence that the PHC demonstration resulted in clearly negative impacts for the Medicare program. There was no clear evidence of patients in PHC participation hospitals being discharged 'quicker and sicker', as was one policy concern related to gainsharing projects. We observed no consistent increases in Medicare post-acute care during the 90-day post-discharge window defined under this project. But we also observed only limited impacts that would be consistent with major improvements in the efficiency of inpatient care. Average

total episode payments in PHC participating hospitals were $24,822 during the base year, about $115 higher than observed for comparison hospitals. By the third performance year of the demonstration, average total episode payments increased $2,988 for the participating hospitals compared to $2,475 for the comparison hospitals during the same period.

Despite a clear focus on this strategy, impacts on length of stay were minimal. Given the emphasis the PHC demonstration hospitals placed on reducing length of stay as key strategy to reduce internal costs and efficiency while potentially improving patient outcomes, we expected to see greater impacts among the PHC hospitals than we observed. Comparison hospitals shortened their average length of stay by 0.33 days compared to 0.28 days for the demonstration hospitals. Comparison hospitals actually experienced steady declines in average length of stay whereas, for PHC hospitals as a group, the decline ended in performance year 2. Only four PHC hospitals had declines between performance years 2 and 3 larger than those for the comparison hospitals. Both groups' average lengths of stay, were greater than 6 days or just below in the baseline and first two performance years, exceeded the national Medicare average length of stay (5.6 days in 2008, 5.5 days in 2009, 5.4 in 2010 and 2011, and 5.3 in 2012).

No systematic negative – or positive -- impacts on quality of care were observed. The internal savings strategies introduced in the PHC Demonstration to reduce internal hospital costs were designed to avoid negative impacts on clinical quality of care. Typical savings strategies employed by the PHC demonstration sites included reduced length of stay (LOS), reduced inpatient diagnostic testing, and more timely and/or efficient use of specialist consultations. In addition to strategies initiated at the beginning of the demonstration, later savings strategies focused on better coordination of care, improved transitions of patients across care settings, and the development of targeted case and/or discharge management of high-risk patients. The latter was used by a number of sites as a mechanism to support physicians and make them more efficient. We found no statistically significant impact of the demonstration on any of the quality measures. But we also found no evidence of systematic improvement in clinical quality of care.

No significant impacts on patient selection were found. Early policy concerns regarding gainsharing theorized that physicians participating in gainsharing may have an increased financial incentive to avoid potentially high cost admissions. To test this, we conducted a market analysis of demonstration and comparison hospitals as well as analyzing admitting patterns for physicians admitting at both demonstration and comparison hospitals. We did note wide variation among the demonstration hospitals in their rates of admissions through the emergency room, outlier rate, severity of admissions, and transfer patterns. In our analysis of physician referral patterns, we found that a large number of physicians at demonstration hospitals also admitted at another acute care hospital suggesting at least the possibility that physicians may have some ability to shift high cost patients away from demonstration hospitals. However, while we did find some small shifts in transfer rates overall, theses shifts did not appear to be related to physician incentive payments.

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APPENDIX TABLES

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Appendix Table 5-1
Means of explanatory variables by time period and demonstration status

Name	Base year comparison	Base year demo	Performance year 1 comparison	Performance year 1 demo	Performance year 2 comparison	Performance year 2 demo	Performance year 3 comparison	Performance year 3 demo
Patient age 0 to 64	0.109	0.098	0.118	0.105	0.120	0.108	0.123	0.111
Patient age 65 to 69	0.121	0.127	0.126	0.133	0.128	0.133	0.132	0.136
Patient age 70 to 74	0.144	0.145	0.146	0.146	0.138	0.144	0.141	0.146
Patient age 75 to 79	0.177	0.184	0.166	0.168	0.159	0.164	0.157	0.161
Patient age 80 plus	0.449	0.445	0.444	0.449	0.456	0.451	0.447	0.447
Female	0.590	0.579	0.591	0.583	0.591	0.581	0.590	0.573
Non-white	0.141	0.126	0.147	0.137	0.152	0.139	0.153	0.133
DRG weight	1.413	1.510	1.450	1.511	1.452	1.501	1.476	1.552
HCC Risk Score	3.353	3.239	3.552	3.372	3.462	3.381	3.446	3.438
IPPS Area Wage Index	1.255	1.218	1.223	1.186	1.221	1.184	1.220	1.183
Intern/Resident to bed ratio	0.129	0.094	0.132	0.102	0.134	0.102	0.133	0.100
Hospital beds	364	338	368	355	358	360	357	367
DSH adjustment factor (operating)	0.046	0.045	0.040	0.040	0.045	0.036	0.038	0.033
Average LOS for DRG	5.190	5.163	5.122	5.078	4.955	4.935	4.843	4.930
Number of Observations	55,983	51,353	52,106	50,096	51,363	49,119	48,666	46,295

NOTE: DRG = diagnosis-related group; DSH = disproportionate share hospital; HCC = hierarchical condition category;

IPPS = inpatient prospective payment system; LOS = length of stay.

SOURCE: RTI processing of Medicare claims.

run_req045_stats_v3, part 8 (4-21-2014)

Appendix Table 5-2
Mean Medicare Payments

Period (Payment component)	Base Year		Performance Year 1		Performance Year 2		Performance Year 3	
	comparison	demo	comparison	demo	comparison	demo	comparison	demo
14-day pre-admission period								
Physician	235	249	251	265	260	273	269	286
Outpatient	78	89	99	104	106	106	110	122
Durable medical equipment	15	15	16	14	23	20	17	18
Total	328	354	366	383	390	400	396	426
Index hospitalization period								
IPPS hospital inlier	8,823	9,213	9,210	9,335	9,153	9,113	9,319	9,443
IPPS hospital outlier	178	159	195	193	214	205	203	220
IPPS hospital total	9,001	9,371	9,405	9,528	9,368	9,318	9,523	9,663
Physician	1,486	1,567	1,558	1,675	1,586	1,683	1,582	1,701
Total	10,486	10,938	10,963	11,203	10,953	11,001	11,105	11,364
Post-discharge period								
Inpatient	5,782	5,487	6,033	5,774	6,085	5,776	6,016	5,939
Skilled nursing facility	4,040	3,894	4,462	4,517	5,299	5,313	4,864	5,151
Durable medical equipment	174	173	187	165	296	290	154	153
Outpatient	595	524	781	685	832	766	874	859
Physician	2,319	2,357	2,507	2,591	2,626	2,669	2,648	2,749
Home health agency	981	1,095	1,124	1,193	1,086	1,154	1,123	1,170
Total	13,890	13,530	15,095	14,925	16,224	15,970	15,679	16,020
Total episode	24,705	24,822	26,424	26,511	27,567	27,371	27,180	27,810
Number of Observations	55,983	51,353	52,106	50,096	51,363	49,119	48,666	46,295

NOTE: IPPS = inpatient prospective payment system

SOURCE: RTI processing of Medicare claims.

run_req045_stats_v3, part 12 (4-21-2014)

Appendix Table 5-3
Percent of Total Episode Payments

Period (Payment component)	Base Year		Performance Year 1		Performance Year 2		Performance Year 3	
	comparison	demo	comparison	demo	comparison	demo	comparison	demo
14-day pre-admission period								
Physician	0.95	1.00	0.95	1.00	0.94	1.00	0.99	1.03
Outpatient	0.32	0.36	0.37	0.39	0.38	0.39	0.40	0.44
Durable medical equipment	0.06	0.06	0.06	0.05	0.09	0.07	0.06	0.07
Total	1.33	1.43	1.39	1.44	1.41	1.46	1.46	1.53
Index hospitalization period								
IPPS hospital inlier	35.71	37.12	34.86	35.21	33.20	33.30	34.29	33.95
IPPS hospital outlier	0.72	0.64	0.74	0.73	0.78	0.75	0.75	0.79
IPPS hospital total	36.43	37.75	35.59	35.94	33.98	34.05	35.04	34.75
Physician	6.01	6.31	5.90	6.32	5.75	6.15	5.82	6.12
Total	42.45	44.07	41.49	42.26	39.73	40.19	40.86	40.86
Post-discharge period								
Inpatient	23.40	22.11	22.83	21.78	22.07	21.10	22.13	21.36
Skilled nursing facility	16.35	15.69	16.89	17.04	19.22	19.41	17.90	18.52
Durable medical equipment	0.71	0.70	0.71	0.62	1.07	1.06	0.57	0.55
Outpatient	2.41	2.11	2.96	2.59	3.02	2.80	3.22	3.09
Physician	9.39	9.49	9.49	9.77	9.52	9.75	9.74	9.88
Home health agency	3.97	4.41	4.26	4.50	3.94	4.22	4.13	4.21
Total	56.22	54.51	57.13	56.30	58.85	58.35	57.69	57.61

NOTE: IPPS = inpatient prospective payment system

SOURCE: RTI processing of Medicare claims.

run_req045_stats_v3, part 12 (4-21-2014)

Appendix Table 5-4
Dollar change in the components of Medicare payments

Period (Payment component)	Mean Payments								
	Change between BY and performance year 1 comparison	Change between BY and performance year 1 demo	Difference in differences	Change between BY and performance year 2 comparison	Change between BY and performance year 2 demo	Difference in differences	Change between BY and performance year 3 comparison	Change between BY and performance year 3 demo	Difference in differences
14-day pre-admission period									
Physician	16	15	-1	25	24	-1	34	37	3
Outpatient	21	15	-6	28	17	-11	31	32	1
Durable medical equipment	1	-1	-2	9	5	-3	2	3	1
Total	38	29	-9	61	46	-15	67	72	5
Index hospitalization period									
IPPS hospital inlier	387	122	-265	330	-99	-430	496	230	-267
IPPS hospital outlier	17	35	18	37	47	10	26	62	36
IPPS hospital total	404	157	-248	367	-53	-420	522	292	-231
Physician	72	108	35	100	116	15	97	134	38
Total	477	264	-212	467	63	-405	619	426	-193
Post-discharge period									
Inpatient	251	287	36	304	289	-15	235	452	217
Skilled nursing facility	423	623	200	1,260	1,420	160	825	1,257	432
Durable medical equipment	13	-8	-21	122	117	-5	-20	-20	0
Outpatient	186	161	-25	236	242	6	279	335	56
Physician	188	235	46	306	313	7	329	392	64
Home health agency	144	98	-46	106	59	-47	142	75	-67
Total	1,205	1,396	191	2,334	2,440	106	1,789	2,490	702
Total episode	1,720	1,689	-30	2,862	2,549	-313	2,475	2,988	513
Number of Observations	-3,877	-1,257	2,620	-4,620	-2,234	2,386	-7,317	-5,058	2,259

NOTE: IPPS = inpatient prospective payment system

SOURCE: RTI processing of Medicare claims.

run_req045_stats_v3, part 12 (4-21-2014)

Appendix Table 5-5
Mean Episode Payments, Length of Stay, and IPPS Outliers by Group and Time Period

	Base year		Performance Year 1		Performance Year 2		Performance Year 3	
Name	Comparison	demo	Comparison	demo	Comparison	demo	Comparison	demo
Total Episode Medicare Payments*	$24,705	$24,822	$26,424	$26,511	$27,567	$27,371	$27,180	$27,810
Total episode payments other than the payment to the index hospital*	$15,704	$15,450	$17,019	$16,983	$18,200	$18,052	$17,657	$18,147
Total episode payments other than the flat inlier DRG payment to the index hospital. This includes any outlier payments made to the index hospital.*	$15,882	$15,609	$17,214	$17,176	$18,414	$18,257	$17,860	$18,367
Total episode payments for the 14-day pre-admission period plus the 30-post discharge period (same as second type except physician payments during the index hospitalization are excluded)*	$14,219	$13,883	$15,461	$15,308	$16,614	$16,370	$16,075	$16,446
Length of Stay (days)	6.21	6.32	5.98	6.14	5.91	6.01	5.87	6.04
IPPS Outlier (index hospitalization [discharge])								
Outlier payments overall index discharges	$178	$159	$195	$193	$214	$205	$203	$220
Percent of Index discharges with outlier payments	1.23%	1.36%	1.38%	1.57%	1.42%	1.59%	1.48%	1.66%
Outlier payments per index discharges with an outlier	$14,460	$11,631	$14,132	$12,332	$15,151	$12,935	$13,786	$13,247
Number of observations	55,983	51,353	52,106	50,096	51,363	49,119	48,666	46,295

NOTE: *Excludes beneficiary co-payments. BY = base year; DRG = diagnosis-related group; IPPS = inpatient prospective payment system.

SOURCE: RTI processing of Medicare claims.

run_req045_stats_v3, parts 10 and 13b (4-21-2014)

Appendix Table 5-6
Change in Mean Episode Payments, Length of Stay, and IPPS Outliers by Group and Time Period

Name	Change between BY and perform-ance year 1 comparison	Change between BY and perform-ance year 1 demo	Difference in differences	Change between BY and perform-ance year 2 comparison	Change between BY and perform-ance year 2 demo	Difference in differences	Change between BY and perform-ance year 3 comparison	Change between BY and perform-ance year 3 demo	Difference in differences
Total Episode Medicare Payments*	$1,720	$1,689	-$30	$2,862	$2,549	-$313	$2,475	$2,988	$513
Total episode payments other than the payment to the index hospital*	$1,315	$1,533	$218	$2,495	$2,602	$106	$1,953	$2,697	$744
Total episode payments other than the flat inlier DRG payment to the index hospital. This includes any outlier payments made to the index hospital.*	$1,332	$1,567	$235	$2,532	$2,648	$116	$1,978	$2,758	$780
Total episode payments for the 14-day pre-admission period plus the 30-post discharge period (same as second type except physician payments during the index hospitalization are excluded)*	$1,243	$1,425	$182	$2,395	$2,486	$91	$1,856	$2,562	$707
Length of Stay (days)	-0.23	-0.18	0.05	-0.29	-0.31	-0.01	-0.33	-0.28	0.05
IPPS Outlier (index hospitalization [discharge])									
Outlier payments overall index discharges	$17	$35	$18	$37	$47	$10	$26	$62	$36
Percent of Index discharges with outlier payments	0.15%	0.20%	0.05%	0.19%	0.22%	0.04%	0.25%	0.30%	0.05%
Outlier payments per index discharges with an outlier	-$328	$700	$1,028	$691	$1,304	$613	-$674	$1,615	$2,289
Number of observations	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

NOTE: *Excludes beneficiary co-payments. BY = base year; DRG = diagnosis-related group; IPPS = inpatient prospective payment system.

SOURCE: RTI processing of Medicare claims.

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Appendix Table 6-1
Base year occurrences and population at risk for selected conditions: PHC hospitals and their comparison group

Hospital	AMI	CHF	Stroke	GI Hemorrhage	Hip Fracture	Pneumonia
Hunterdon Medical Center						
Number of occurrences	4	3	5	1	1	4
Population at risk	30	89	49	80	38	89
Holy Name Hospital						
Number of occurrences	5	6	6	3	2	12
Population at risk	77	214	65	101	65	165
Valley Hospital						
Number of occurrences	26	21	31	5	7	15
Population at risk	240	522	174	224	190	254
St. Francis Medical Center						
Number of occurrences	1	0	1	2	1	3
Population at risk	47	97	26	33	15	39
Our Lady of Lourdes Medical Center						
Number of occurrences	18	8	13	3	2	3
Population at risk	177	212	104	79	39	78
Somerset Medical Center						
Number of occurrences	13	10	12	1	4	9
Population at risk	96	225	115	75	85	156
Overlook Hospital						
Number of occurrences	17	11	40	3	6	24
Population at risk	88	270	205	195	147	240

(continued)

Appendix Table 6-1 (continued)
Base year occurrences and population at risk for selected conditions: PHC hospitals and their comparison group

Hospital	AMI	CHF	Stroke	GI Hemorrhage	Hip Fracture	Pneumonia
Atlanticare Regional Medical Center						
Number of occurrences	11	10	15	4	2	6
Population at risk	153	327	132	158	77	139
Jersey Shore University Medical Center						
Number of occurrences	23	9	19	2	3	6
Population at risk	179	377	153	125	97	97
Monmouth Medical Center						
Number of occurrences	3	6	0	4	2	0
Population at risk	37	131	54	76	39	75
JFK Medical Center						
Number of occurrences	10	12	16	2	2	9
Population at risk	58	229	103	154	80	112
Centrastate Medical Center						
Number of occurrences	7	3	6	3	1	16
Population at risk	34	172	80	113	87	188
Comparison Hospitals						
Number of occurrences	120	97	150	33	31	81
Population at risk	1106	2869	1288	1553	1018	1771

Appendix Table 6-2
Year 1 occurrences and population at risk for selected conditions: PHC hospitals and their comparison group

Hospital	AMI	CHF	Stroke	GI Hemorrhage	Hip Fracture	Pneumonia
Hunterdon Medical Center						
Number of occurrences	2	5	5	1	2	7
Population at risk	32	73	44	60	43	86
Holy Name Hospital						
Number of occurrences	7	7	15	0	0	8
Population at risk	76	203	85	94	56	136
Valley Hospital						
Number of occurrences	21	21	25	4	5	15
Population at risk	229	478	191	235	202	203
St. Francis Medical Center						
Number of occurrences	3	1	1	0	0	3
Population at risk	45	99	21	32	16	43
Our Lady of Lourdes Medical Center						
Number of occurrences	11	5	6	3	0	4
Population at risk	154	231	85	72	29	75
Somerset Medical Center						
Number of occurrences	13	9	14	1	5	5
Population at risk	87	225	93	90	76	118
Overlook Hospital						
Number of occurrences	8	10	40	4	2	8
Population at risk	91	265	234	188	143	222

(continued)

Appendix Table 6-2 (continued)
Year 1 occurrences and population at risk for selected conditions: PHC hospitals and their comparison group

Hospital	AMI	CHF	Stroke	GI Hemorrhage	Hip Fracture	Pneumonia
Atlanticare Regional Medical Center						
Number of occurrences	17	7	17	3	2	10
Population at risk	167	309	140	141	98	148
Jersey Shore University Medical Center						
Number of occurrences	14	7	17	3	1	7
Population at risk	147	375	167	133	97	120
Monmouth Medical Center						
Number of occurrences	0	6	2	0	0	0
Population at risk	39	137	65	78	51	69
JFK Medical Center						
Number of occurrences	15	7	9	2	2	11
Population at risk	90	248	99	181	99	132
Centrastate Medical Center						
Number of occurrences	4	2	3	1	3	4
Population at risk	26	144	59	120	88	134
Comparison Hospitals						
Number of occurrences	105	100	152	24	23	69
Population at risk	960	2735	1332	1464	1005	1540

Appendix Table 6-3
Year 2 occurrences and population at risk for selected conditions: PHC hospitals and their comparison group

Hospital	AMI	CHF	Stroke	GI Hemorrhage	Hip Fracture	Pneumonia
Hunterdon Medical Center						
Number of occurrences	3	5	6	3	3	4
Population at risk	27	81	40	58	40	102
Holy Name Hospital						
Number of occurrences	5	5	10	1	0	4
Population at risk	73	212	86	89	55	138
Valley Hospital						
Number of occurrences	15	14	31	2	8	12
Population at risk	209	472	201	225	188	203
St. Francis Medical Center						
Number of occurrences	2	2	0	1	0	4
Population at risk	27	64	15	32	13	38
Our Lady of Lourdes Medical Center						
Number of occurrences	15	8	9	3	0	3
Population at risk	154	166	80	93	27	87
Somerset Medical Center						
Number of occurrences	17	12	10	4	3	10
Population at risk	94	206	95	117	80	148
Overlook Hospital						
Number of occurrences	7	13	42	6	3	3
Population at risk	83	274	225	172	139	203

(continued)

Appendix Table 6-3 (continued)
Year 2 occurrences and population at risk for selected conditions: PHC hospitals and their comparison group

Hospital	AMI	CHF	Stroke	GI Hemorrhage	Hip Fracture	Pneumonia
Atlanticare Regional Medical Center						
Number of occurrences	8	6	30	1	2	9
Population at risk	161	261	188	129	83	158
Jersey Shore University Medical Center						
Number of occurrences	18	4	17	3	6	7
Population at risk	172	356	188	132	96	119
Monmouth Medical Center						
Number of occurrences	2	2	2	3	0	1
Population at risk	28	117	66	71	42	51
JFK Medical Center						
Number of occurrences	12	11	12	2	1	12
Population at risk	76	235	105	169	87	160
Centrastate Medical Center						
Number of occurrences	4	7	3	3	1	12
Population at risk	31	158	75	119	92	165
Comparison Hospitals						
Number of occurrences	113	88	155	30	32	55
Population at risk	964	2525	1393	1453	1030	1590

Appendix Table 6-4
Year 3 occurrences and population at risk for selected conditions: PHC hospitals and their comparison group

Hospital	AMI	CHF	Stroke	GI Hemorrhage	Hip Fracture	Pneumonia
Hunterdon Medical Center						
Number of occurrences	4	3	8	1	0	7
Population at risk	43	69	53	68	46	100
Holy Name Hospital						
Number of occurrences	3	3	9	3	0	6
Population at risk	67	158	104	74	55	142
Valley Hospital						
Number of occurrences	14	10	25	3	3	12
Population at risk	259	355	227	257	176	240
St. Francis Medical Center						
Number of occurrences	0	1	1	0	0	2
Population at risk	35	72	19	18	14	48
Our Lady of Lourdes Medical Center						
Number of occurrences	14	6	8	2	3	1
Population at risk	133	155	80	72	37	65
Somerset Medical Center						
Number of occurrences	18	7	9	2	1	4
Population at risk	126	221	109	89	84	119
Overlook Hospital						
Number of occurrences	5	14	34	3	7	16
Population at risk	97	277	225	172	140	221

(continued)

Appendix Table 6-4 (continued)
Year 3 occurrences and population at risk for selected conditions: PHC hospitals and their comparison group

Hospital	AMI	CHF	Stroke	GI Hemorrhage	Hip Fracture	Pneumonia
Atlanticare Regional Medical Center						
Number of occurrences	13	6	23	4	0	7
Population at risk	179	250	198	123	80	151
Jersey Shore University Medical Center						
Number of occurrences	11	15	14	2	2	9
Population at risk	129	288	164	137	90	167
Monmouth Medical Center						
Number of occurrences	1	1	4	2	0	1
Population at risk	16	101	71	76	33	59
JFK Medical Center						
Number of occurrences	11	4	16	2	4	12
Population at risk	81	204	113	133	71	163
Centrastate Medical Center						
Number of occurrences	5	1	3	2	2	4
Population at risk	27	136	79	94	93	149
Comparison Hospitals						
Number of occurrences	104	66	164	33	24	68
Population at risk	999	2107	1432	1449	1013	1475

Appendix Table 6-5
Base year occurrences and population at risk for selected complications: PHC hospitals and their comparison group

Hospital	Death in low-mortality DRGs	Pressure ulcer	Death among surgical patients	Iatrogenic pneu-mothorax	Central venous catheter-related blood-stream infections	Post-operative hip fracture	Post-operative hemorrhage or hematoma	Post-operative physiologic and metabolic derange-ments	Post-operative respiratory failure	Post-operative pulmonary embolism or deep vein thrombosis	Post-operative sepsis	Post-operative wound dehiscence	Accidental puncture or laceration
Hunterdon Medical Center													
Number of occurrences	2	4	3	1	1	0	0	0	0	1	0	0	4
Population at risk	80	852	11	1558	1374	134	147	56	55	146	7	71	1649
Holy Name Hospital													
Number of occurrences	4	22	4	0	1	0	1	0	2	6	0	0	5
Population at risk	190	1629	30	2906	2375	295	332	142	138	326	27	166	3011
Valley Hospital													
Number of occurrences	6	17	5	1	3	0	3	0	7	13	1	1	9
Population at risk	278	2936	38	6336	5324	760	861	451	340	851	162	434	6638
St. Francis Medical Center													
Number of occurrences	0	4	2	1	0	0	0	0	0	0	1	0	3
Population at risk	49	504	7	1031	948	112	122	76	38	122	43	41	1100
Our Lady of Lourdes Medical Center													
Number of occurrences	2	9	4	0	1	0	3	0	3	4	2	0	2
Population at risk	124	1378	24	2610	2353	367	399	227	151	397	103	168	2822
Somerset Medical Center													
Number of occurrences	7	11	9	0	2	0	0	0	7	6	2	0	3
Population at risk	173	1498	21	3067	2586	257	303	141	134	298	44	151	3153
Overlook Hospital													
Number of occurrences	14	20	11	2	0	0	1	0	1	14	0	0	8
Population at risk	205	1874	38	3654	2894	358	462	191	180	455	61	268	3733
Atlanticare Regional Medical Center													
Number of occurrences	2	14	6	2	3	0	2	0	3	5	2	1	7
Population at risk	236	2281	26	4544	4036	288	321	154	119	314	56	135	4728

(continued)

Appendix Table 6-5 (continued)
Base year occurrences and population at risk for selected complications: PHC hospitals and their comparison group

Hospital	Death in low-mortality DRGs	Pressure ulcer	Death among surgical patients	Iatrogenic pneu-mothorax	Central venous catheter-related blood-stream infections	Post-operative hip fracture	Post-operative hemorrhage or hematoma	Post-operative physiologic and metabolic derange-ments	Post-operative respiratory failure	Post-operative pulmonary embolism or deep vein thrombosis	Post-operative sepsis	Post-operative wound dehiscence	Accidental puncture or laceration
Jersey Shore University Medical Center													
Number of occurrences	4	13	3	1	1	0	3	0	5	6	1	0	13
Population at risk	286	2229	22	4784	4341	619	674	452	285	671	189	204	5229
Monmouth Medical Center													
Number of occurrences	0	15	2	0	3	0	2	0	2	2	0	0	3
Population at risk	115	888	9	1930	1637	238	274	194	188	272	38	150	1971
JFK Medical Center													
Number of occurrences	2	15	4	3	3	0	0	0	4	6	3	0	4
Population at risk	156	1901	26	3333	2669	298	337	194	184	333	50	145	3371
Centrastate Medical Center													
Number of occurrences	11	7	4	2	0	0	4	0	2	2	0	2	7
Population at risk	230	1365	11	2993	2547	221	238	77	75	238	21	148	3090
Comparison Hospitals													
Number of occurrences	46	194	51	12	13	0	15	1	28	51	13	4	76
Population at risk	2480	21016	235	42628	35868	4080	4569	2275	2038	4535	598	2457	44244

Appendix Table 6-6
Year 1 occurrences and population at risk for selected complications: PHC hospitals and their comparison group

Hospital	Death in low-mortality DRGs	Pressure ulcer	Death among surgical patients	Iatrogenic pneu-mothorax	Central venous catheter-related blood-stream infections	Post-operative hip fracture	Post-operative hemorrhage or hematoma	Post-operative physiologic and metabolic derange-ments	Post-operative respiratory failure	Post-operative pulmonary embolism or deep vein thrombosis	Post-operative sepsis	Post-operative wound dehiscence	Accidental puncture or laceration
Hunterdon Medical Center													
Number of occurrences	4	0	0	1	2	0	0	0	0	0	0	0	0
Population at risk	77	712	3	1469	1267	128	146	58	55	145	14	71	1517
Holy Name Hospital													
Number of occurrences	3	0	0	4	3	0	1	0	0	6	0	0	3
Population at risk	170	1515	7	2826	2306	256	291	134	127	291	28	148	2916
Valley Hospital													
Number of occurrences	11	0	3	5	2	0	2	1	3	9	6	1	15
Population at risk	255	2612	20	6273	5195	710	802	402	301	798	141	364	6552
St. Francis Medical Center													
Number of occurrences	0	0	0	2	2	0	2	0	0	1	1	0	1
Population at risk	44	503	2	906	848	91	104	67	29	104	38	34	975
Our Lady of Lourdes Medical Center													
Number of occurrences	0	0	1	1	0	0	1	1	3	2	2	0	4
Population at risk	107	1232	12	2245	1985	323	350	212	146	350	94	141	2418
Somerset Medical Center													
Number of occurrences	4	0	1	0	0	0	0	0	4	1	0	2	2
Population at risk	160	1474	5	3095	2646	239	259	130	130	258	26	137	3197
Overlook Hospital													
Number of occurrences	3	0	0	1	0	0	2	0	7	5	0	0	6
Population at risk	188	1837	11	3968	3129	419	523	240	228	511	61	236	4053
Atlanticare Regional Medical Center													
Number of occurrences	4	0	0	1	4	0	0	0	1	2	1	0	5
Population at risk	223	2292	3	4503	4049	272	313	120	83	311	53	111	4670

(continued)

Appendix Table 6-6 (continued)
Year 1 occurrences and population at risk for selected complications: PHC hospitals and their comparison group

Hospital	Death in low-mortality DRGs	Pressure ulcer	Death among surgical patients	Iatrogenic pneu-mothorax	Central venous catheter-related blood-stream infections	Post-operative hip fracture	Post-operative hemorrhage or hematoma	Post-operative physiologic and metabolic derange-ments	Post-operative respiratory failure	Post-operative pulmonary embolism or deep vein thrombosis	Post-operative sepsis	Post-operative wound dehiscence	Accidental puncture or laceration
Jersey Shore University Medical Center													
Number of occurrences	6	0	2	1	1	0	2	0	5	5	4	1	23
Population at risk	314	2174	19	4636	4127	609	682	445	244	681	228	236	5030
Monmouth Medical Center													
Number of occurrences	0	0	0	0	0	0	0	0	2	3	1	0	3
Population at risk	114	888	4	2037	1708	210	234	140	135	235	22	132	2066
JFK Medical Center													
Number of occurrences	6	0	2	1	10	0	2	0	6	11	3	0	6
Population at risk	136	1949	16	3270	2664	337	392	192	185	390	57	170	3326
Centrastate Medical Center													
Number of occurrences	1	0	0	2	0	0	0	0	0	0	0	0	12
Population at risk	132	1223	1	2499	2154	227	244	77	75	246	24	158	2581
Comparison Hospitals													
Number of occurrences	30	4	7	6	11	0	15	0	34	36	18	5	79
Population at risk	2104	18978	94	39665	33357	3881	4373	2099	1847	4344	557	1936	41093

Appendix Table 6-7
Year 2 occurrences and population at risk for selected complications: PHC hospitals and their comparison group

Hospital	Death in low-mortality DRGs	Pressure ulcer	Death among surgical patients	Iatrogenic pneu-mothorax	Central venous catheter-related blood-stream infections	Post-operative hip fracture	Post-operative hemorrhage or hematoma	Post-operative physiologic and metabolic derange-ments	Post-operative respiratory failure	Post-operative pulmonary embolism or deep vein thrombosis	Post-operative sepsis	Post-operative wound dehiscence	Accidental puncture or laceration
Hunterdon Medical Center													
Number of occurrences	0	0	0	1	0	0	0	0	1	0	1	0	0
Population at risk	76	651	2	1520	1292	103	116	56	54	116	13	41	1591
Holy Name Hospital													
Number of occurrences	2	1	0	1	3	0	0	0	0	1	0	0	4
Population at risk	166	1423	3	2929	2333	288	325	136	135	325	16	189	3030
Valley Hospital													
Number of occurrences	6	3	2	2	0	0	4	1	7	16	2	0	11
Population at risk	222	2656	17	5914	4712	687	808	425	306	802	155	383	6332
St. Francis Medical Center													
Number of occurrences	1	0	0	0	1	0	0	0	0	0	0	0	0
Population at risk	44	374	1	767	662	58	65	36	21	65	18	23	808
Our Lady of Lourdes Medical Center													
Number of occurrences	1	0	0	0	0	0	3	0	7	1	1	1	3
Population at risk	88	966	5	1969	1631	313	339	175	129	338	75	136	2120
Somerset Medical Center													
Number of occurrences	4	2	2	0	3	0	1	0	5	5	0	0	4
Population at risk	190	1390	5	3029	2501	242	273	157	148	274	33	143	3158
Overlook Hospital													
Number of occurrences	2	0	1	1	1	0	2	0	3	19	0	0	5
Population at risk	169	1920	9	4073	3175	410	502	225	218	501	74	237	4235
Atlanticare Regional Medical Center													
Number of occurrences	5	0	0	2	0	0	0	0	4	4	0	0	2
Population at risk	235	2200	13	4600	4038	296	347	149	91	342	71	130	4799

(continued)

Appendix Table 6-7 (continued)
Year 2 occurrences and population at risk for selected complications: PHC hospitals and their comparison group

Hospital	Death in low-mortality DRGs	Pressure ulcer	Death among surgical patients	Iatrogenic pneu-mothorax	Central venous catheter-related blood-stream infections	Post-operative hip fracture	Post-operative hemorrhage or hematoma	Post-operative physiologic and metabolic derange-ments	Post-operative respiratory failure	Post-operative pulmonary embolism or deep vein thrombosis	Post-operative sepsis	Post-operative wound dehiscence	Accidental puncture or laceration
Jersey Shore University Medical Center													
Number of occurrences	5	1	4	3	2	0	0	1	2	9	2	0	18
Population at risk	250	2112	15	4128	3517	579	642	428	233	642	191	208	4520
Monmouth Medical Center													
Number of occurrences	0	0	0	0	1	0	1	0	2	5	0	0	1
Population at risk	68	849	4	1978	1526	212	237	156	153	234	26	113	2011
JFK Medical Center													
Number of occurrences	8	0	0	1	4	0	1	0	5	14	0	0	4
Population at risk	148	1581	10	3031	2470	272	324	159	148	319	44	145	3073
Centrastate Medical Center													
Number of occurrences	4	2	0	1	2	0	1	0	1	2	0	1	8
Population at risk	167	1135	3	2657	2141	265	289	105	102	289	15	143	2762
Comparison Hospitals													
Number of occurrences	32	20	7	14	12	0	16	0	30	51	7	5	82
Population at risk	1917	18010	70	38837	31691	3578	4069	1799	1573	4065	466	1887	40255

Appendix Table 6-8
Year 3 occurrences and population at risk for selected complications: PHC hospitals and their comparison group

Hospital	Death in low-mortality DRGs	Pressure ulcer	Death among surgical patients	Iatrogenic pneu-mothorax	Central venous catheter-related blood-stream infections	Post-operative hip fracture	Post-operative hemorrhage or hematoma	Post-operative physiologic and metabolic derange-ments	Post-operative respiratory failure	Post-operative pulmonary embolism or deep vein thrombosis	Post-operative sepsis	Post-operative wound dehiscence	Accidental puncture or laceration
Hunterdon Medical Center													
Number of occurrences	2	1	0	2	0	0	0	0	0	1	0	0	0
Population at risk	76	702	2	1517	1277	103	112	40	40	111	9	52	1605
Holy Name Hospital													
Number of occurrences	2	0	1	0	1	0	0	0	3	4	0	1	2
Population at risk	148	1317	7	2569	1953	235	267	114	110	267	23	154	2654
Valley Hospital													
Number of occurrences	4	0	3	2	0	0	2	0	5	12	1	1	9
Population at risk	209	2668	14	5576	4200	630	737	335	236	733	109	344	5946
St. Francis Medical Center													
Number of occurrences	0	0	1	2	2	0	1	0	1	2	0	0	2
Population at risk	35	369	2	711	593	69	77	37	16	78	25	18	756
Our Lady of Lourdes Medical Center													
Number of occurrences	0	1	0	1	2	0	3	0	4	2	1	1	4
Population at risk	59	866	8	1736	1389	288	302	179	101	301	87	103	1950
Somerset Medical Center													
Number of occurrences	2	0	2	1	0	0	1	0	5	1	4	0	4
Population at risk	95	1256	7	2700	2150	168	196	105	97	194	29	95	2798
Overlook Hospital													
Number of occurrences	8	0	3	0	1	0	2	0	7	14	4	2	4
Population at risk	180	1869	16	3989	2908	427	552	255	244	544	71	277	4107
Atlanticare Regional Medical Center													
Number of occurrences	2	1	2	0	1	0	2	0	2	6	1	0	4
Population at risk	171	2068	8	4478	3773	304	350	132	85	346	59	146	4680

(continued)

Appendix Table 6-8 (continued)
Year 3 occurrences and population at risk for selected complications: PHC hospitals and their comparison group

Hospital	Death in low-mortality DRGs	Pressure ulcer	Death among surgical patients	Iatrogenic pneu-mothorax	Central venous catheter-related blood-stream infections	Post-operative hip fracture	Post-operative hemorrhage or hematoma	Post-operative physiologic and metabolic derange-ments	Post-operative respiratory failure	Post-operative pulmonary embolism or deep vein thrombosis	Post-operative sepsis	Post-operative wound dehiscence	Accidental puncture or laceration
Jersey Shore University Medical Center													
Number of occurrences	2	1	0	2	1	0	1	0	1	2	0	0	11
Population at risk	220	2121	2	3818	3091	598	691	107	86	692	27	214	4223
Monmouth Medical Center													
Number of occurrences	1	0	0	0	3	0	1	0	4	0	0	2	3
Population at risk	67	824	4	2040	1420	197	215	157	155	215	28	115	2044
JFK Medical Center													
Number of occurrences	6	0	0	1	0	0	0	0	1	9	0	0	6
Population at risk	134	1386	3	2709	2212	270	311	148	143	309	26	147	2759
Centrastate Medical Center	0	0	0										
Number of occurrences				0	0	0	2	0	1	0	0	0	13
Population at risk	125	970	1	2483	1819	233	261	94	93	259	13	126	2568
Comparison Hospitals													
Number of occurrences	26	2	12	7	9	0	14	2	33	34	7	5	67
Population at risk	1516	16926	69	36716	28457	3390	3861	1698	1519	3851	440	1856	37990

Appendix Table 6-9
Base Year hospital process of care measures: AMI, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Aspirin at arrival	Aspirin prescribed at discharge	ACEI or ARB for LVSD	Adult smoking cessation advice/counseling	Beta blocker prescribed at discharge	Primary PCI received within 90 minutes of hospital arrival	AMI composite score
Hunterdon Medical Center							
# patients	93	69	17	14	71	35	—
% receiving	*99%*	*100%*	*100%*	*100%*	*99%*	*91%*	**98%**
Holy Name Hospital							
# patients	191	119	25	21	130	22	—
% receiving	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	**100%**
Valley Hospital							
# patients	240	244	46	50	284	38	—
% receiving	*97%*	*98%*	*96%*	*100%*	*98%*	*89%*	**97%**
St Francis Medical Center							
# patients	109	248	50	92	247	22	—
% receiving	*100%*	*98%*	*96%*	*100%*	*98%*	*77%*	**98%**
Our Lady of Lourdes Medical Center							
# patients	114	289	57	106	268	20	—
% receiving	*100%*	*99%*	*100%*	*100%*	*99%*	*75%*	**99%**
Somerset Medical Center							
# patients	248	183	26	50	200	53	—
% receiving	*99%*	*100%*	*100%*	*100%*	*100%*	*74%*	**98%**
Overlook Hospital							
# patients	196	115	37	23	134	55	—
% receiving	*98%*	*93%*	*100%*	*87%*	*98%*	*55%*	**93%**

(continued)

Appendix Table 6-9 (continued)
Base Year hospital process of care measures: AMI, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Aspirin at arrival	Aspirin prescribed at discharge	ACEI or ARB for LVSD	Adult smoking cessation advice/counseling	Beta blocker prescribed at discharge	Primary PCI received within 90 minutes of hospital arrival	AMI composite score
Atlanticare Regional Medical Center							
# patients	198	286	60	108	334	60	—
% receiving	*100%*	*100%*	*98%*	*100%*	*100%*	*73%*	**98%**
Jersey Shore University Medical Center							
# patients	164	410	55	141	399	36	—
% receiving	*100%*	*100%*	*96%*	*100%*	*100%*	*81%*	**99%**
Monmouth Medical Center							
# patients	132	87	8	28	104	21	—
% receiving	*100%*	*99%*	*100%*	*96%*	*99%*	*81%*	**98%**
JFK Medical Center							
# patients	263	118	15	34	142	48	—
% receiving	*97%*	*97%*	*80%*	*97%*	*97%*	*65%*	**94%**
Centrastate Medical Center							
# patients	113	43	8	5	52	0	—
% receiving	*98%*	*95%*	*100%*	*100%*	*100%*	*NA*	**98%**
Comparison Hospitals							
# patients	2733	1980	483	485	2080	349	—
% receiving	*98%*	*98%*	*96%*	*99%*	*99%*	*76%*	**97%**

NOTE: The composite score is calculated by summing the numerator and denominator for each measure in a topic and then dividing numerator by denominator to get the rate.

SOURCE: 2007Q4 - 2008Q3 Inpatient Quality Reporting (formerly Reporting Hospital Quality Data for Annual Payment Update) data

Appendix Table 6-10
Year 1 hospital process of care measures: AMI, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Aspirin at arrival	Aspirin prescribed at discharge	ACEI or ARB for LVSD	Adult smoking cessation advice/counseling	Beta blocker prescribed at discharge	Primary PCI received within 90 minutes of hospital arrival	AMI composite score
Hunterdon Medical Center							
# patients	85	54	9	13	49	26	**236**
% receiving	*100%*	*98%*	*100%*	*100%*	*100%*	*85%*	**98%**
Holy Name Hospital							
# patients	148	97	27	14	114	23	**423**
% receiving	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	**100%**
Valley Hospital							
# patients	199	210	28	50	228	41	**756**
% receiving	*97%*	*99%*	*89%*	*100%*	*99%*	*85%*	**97%**
St Francis Medical Center							
# patients	99	200	29	72	195	29	**624**
% receiving	*100%*	*99%*	*100%*	*100%*	*98%*	*59%*	**97%**
Our Lady of Lourdes Medical Center							
# patients	98	233	51	68	213	22	**685**
% receiving	*100%*	*100%*	*96%*	*100%*	*99%*	*73%*	**98%**
Somerset Medical Center							
# patients	185	123	16	35	133	51	**543**
% receiving	*99%*	*99%*	*94%*	*94%*	*100%*	*80%*	**97%**
Overlook Hospital							
# patients	157	97	20	16	104	33	**427**
% receiving	*98%*	*97%*	*95%*	*88%*	*100%*	*67%*	**95%**

(continued)

Appendix Table 6-10 (continued)
Year 1 hospital process of care measures: AMI, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Aspirin at arrival	Aspirin prescribed at discharge	ACEI or ARB for LVSD	Adult smoking cessation advice/counseling	Beta blocker prescribed at discharge	Primary PCI received within 90 minutes of hospital arrival	AMI composite score
Atlanticare Regional Medical Center							
# patients	153	229	44	96	237	43	**802**
% receiving	*100%*	*100%*	*100%*	*100%*	*100%*	*81%*	**99%**
Jersey Shore University Medical Center							
# patients	118	335	38	115	327	22	**955**
% receiving	*99%*	*99%*	*92%*	*100%*	*99%*	*86%*	**99%**
Monmouth Medical Center							
# patients	110	68	8	18	64	19	**287**
% receiving	*100%*	*100%*	*100%*	*100%*	*100%*	*95%*	**100%**
JFK Medical Center							
# patients	285	166	23	14	177	34	**699**
% receiving	*96%*	*94%*	*87%*	*100%*	*94%*	*71%*	**94%**
Centrastate Medical Center							
# patients	89	32	7	6	13	0	**165**
% receiving	*98%*	*97%*	*86%*	*100%*	*100%*	*NA*	**98%**
Comparison Hospitals							
# patients	2195	1690	354	425	1753	276	**6693**
% receiving	*99%*	*98%*	*97%*	*100%*	*99%*	*81%*	**98%**

NOTE: The composite score is calculated by summing the numerator and denominator for each measure in a topic and then dividing numerator by denominator to get the rate.

SOURCE: 2009Q4 - 2010Q3 Inpatient Quality Reporting (formerly Reporting Hospital Quality Data for Annual Payment Update) data

Appendix Table 6-11
Year 2 hospital process of care measures: AMI, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Aspirin at arrival	Aspirin prescribed at discharge	ACEI or ARB for LVSD	Adult smoking cessation advice/counseling	Beta blocker prescribed at discharge	Primary PCI received within 90 minutes of hospital arrival	AMI composite score
Hunterdon Medical Center							
# patients	130	87	23	24	88	51	**403**
% receiving	*99%*	*100%*	*96%*	*100%*	*99%*	*96%*	**99%**
Holy Name Hospital							
# patients	198	139	31	31	136	23	**558**
% receiving	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	**100%**
Valley Hospital							
# patients	289	298	47	60	297	44	**1035**
% receiving	*99%*	*98%*	*96%*	*100%*	*98%*	*89%*	**98%**
St Francis Medical Center							
# patients	169	299	48	103	274	26	**919**
% receiving	*99%*	*99%*	*100%*	*100%*	*100%*	*69%*	**99%**
Our Lady of Lourdes Medical Center							
# patients	154	293	41	86	288	19	**881**
% receiving	*99%*	*100%*	*100%*	*100%*	*100%*	*89%*	**100%**
Somerset Medical Center							
# patients	253	176	25	56	172	63	**745**
% receiving	*99%*	*99%*	*100%*	*100%*	*99%*	*87%*	**98%**
Overlook Hospital							
# patients	215	161	35	21	160	44	**636**
% receiving	*99%*	*96%*	*86%*	*90%*	*97%*	*82%*	**96%**

(continued)

Appendix Table 6-11 (continued)
Year 2 hospital process of care measures: AMI, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Aspirin at arrival	Aspirin prescribed at discharge	ACEI or ARB for LVSD	Adult smoking cessation advice/counseling	Beta blocker prescribed at discharge	Primary PCI received within 90 minutes of hospital arrival	AMI composite score
Atlanticare Regional Medical Center							
# patients	274	327	56	114	326	62	**1160**
% receiving	*100%*	*100%*	*96%*	*100%*	*99%*	*89%*	**99%**
Jersey Shore University Medical Center							
# patients	245	473	67	151	451	36	**1431**
% receiving	*100%*	*99%*	*100%*	*100%*	*99%*	*92%*	**99%**
Monmouth Medical Center							
# patients	107	62	4	10	63	11	**257**
% receiving	*99%*	*100%*	*100%*	*100%*	*100%*	*100%*	**100%**
JFK Medical Center							
# patients	251	149	39	23	158	66	**686**
% receiving	*99%*	*99%*	*87%*	*100%*	*99%*	*83%*	**97%**
Centrastate Medical Center							
# patients	108	40	9	4	46	0	**207**
% receiving	*98%*	*100%*	*100%*	*100%*	*100%*	*NA*	**99%**
Comparison Hospitals							
# patients	3369	2560	506	552	2576	506	**10069**
% receiving	*100%*	*99%*	*99%*	*100%*	*99%*	*88%*	**99%**

NOTE: The composite score is calculated by summing the numerator and denominator for each measure in a topic and then dividing numerator by denominator to get the rate.

SOURCE: 2010Q4 - 2011Q3 Inpatient Quality Reporting (formerly Reporting Hospital Quality Data for Annual Payment Update) data

Appendix Table 6-12
Base Year hospital process of care measures: heart failure, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Discharge instructions	Evaluation LVS function	ACE inhibitor or ARB for LVSD	Adult Smoking Cessation Advice/Co unseling	HF Composite Score
Hunterdon Medical Center					
# patients	110	135	53	14	—
% receiving	*95%*	*99%*	*83%*	*100%*	**95%**
Holy Name Hospital					
# patients	247	348	88	14	—
% receiving	*100%*	*100%*	*100%*	*100%*	**100%**
Valley Hospital					
# patients	248	352	88	25	—
% receiving	*77%*	*97%*	*90%*	*100%*	**90%**
St Francis Medical Center					
# patients	269	339	154	59	—
% receiving	*91%*	*99%*	*94%*	*100%*	**95%**
Our Lady of Lourdes Medical Center					
# patients	246	298	82	52	—
% receiving	*95%*	*99%*	*100%*	*100%*	**98%**
Somerset Medical Center					
# patients	220	342	84	23	—
% receiving	*95%*	*99%*	*100%*	*100%*	**98%**
Overlook Hospital					
# patients	250	341	102	23	—
% receiving	*90%*	*99%*	*91%*	*83%*	**94%**
Atlanticare Regional Medical Center					
# patients	471	595	198	113	—
% receiving	*99%*	*100%*	*100%*	*100%*	**100%**
Jersey Shore University Medical Center					
# patients	265	369	149	60	—
% receiving	*92%*	*99%*	*97%*	*100%*	**97%**
Monmouth Medical Center					
# patients	205	261	55	35	—
% receiving	*100%*	*100%*	*98%*	*100%*	**100%**

(continued)

Appendix Table 6-12 (continued)
Base Year hospital process of care measures: heart failure, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Discharge instructions	Evaluation LVS function	ACE inhibitor or ARB for LVSD	Adult Smoking Cessation Advice/Co unseling	HF Composite Score
JFK Medical Center					
# patients	356	573	135	40	—
% receiving	*59%*	*98%*	*93%*	*100%*	**85%**
Centrastate Medical Center					
# patients	258	376	86	34	—
% receiving	*72%*	*99%*	*90%*	*100%*	**89%**
Comparison Hospitals					
# patients	4891	6904	1892	853	—
% receiving	*86%*	*97%*	*92%*	*97%*	**93%**

NOTE: The composite score is calculated by summing the numerator and denominator for each measure in a topic and then dividing numerator by denominator to get the rate.

SOURCE: 2007Q4 - 2008Q3 Inpatient Quality Reporting (formerly Reporting Hospital Quality Data for Annual Payment Update) data

Appendix Table 6-13
Year 1 hospital process of care measures: heart failure, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Discharge instructions	Evaluation LVS function	ACE inhibitor or ARB for LVSD	Adult Smoking Cessation Advice/Co unseling	HF Composite Score
Hunterdon Medical Center					
# patients	92	121	43	19	**275**
% receiving	*90%*	*100%*	*93%*	*100%*	**96%**
Holy Name Hospital					
# patients	191	270	57	11	**529**
% receiving	*100%*	*100%*	*100%*	*100%*	**100%**
Valley Hospital					
# patients	185	263	71	14	**533**
% receiving	*70%*	*98%*	*85%*	*100%*	**87%**
St Francis Medical Center					
# patients	165	200	75	54	**494**
% receiving	*98%*	*100%*	*95%*	*100%*	**98%**
Our Lady of Lourdes Medical Center					
# patients	184	233	56	32	**505**
% receiving	*99%*	*100%*	*100%*	*100%*	**100%**
Somerset Medical Center					
# patients	161	257	47	26	**491**
% receiving	*96%*	*100%*	*100%*	*96%*	**98%**
Overlook Hospital					
# patients	210	283	87	15	**595**
% receiving	*91%*	*99%*	*86%*	*93%*	**94%**
Atlanticare Regional Medical Center					
# patients	367	463	145	106	**1081**
% receiving	*100%*	*100%*	*100%*	*100%*	**100%**
Jersey Shore University Medical Center					
# patients	204	274	99	36	**613**
% receiving	*91%*	*99%*	*98%*	*100%*	**96%**
Monmouth Medical Center					
# patients	137	194	44	27	**402**
% receiving	*99%*	*99%*	*100%*	*100%*	**100%**

(continued)

Appendix Table 6-13 (continued)
Year 1 hospital process of care measures: heart failure, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Discharge instructions	Evaluation LVS function	ACE inhibitor or ARB for LVSD	Adult Smoking Cessation Advice/Co unseling	HF Composite Score
JFK Medical Center					
# patients	298	461	121	43	**923**
% receiving	*73%*	*98%*	*88%*	*98%*	**89%**
Centrastate Medical Center					
# patients	216	323	88	20	**647**
% receiving	*69%*	*99%*	*88%*	*100%*	**87%**
Comparison Hospitals					
# patients	4023	5690	1525	654	**11892**
% receiving	*88%*	*99%*	*95%*	*99%*	**95%**

NOTE: The composite score is calculated by summing the numerator and denominator for each measure in a topic and then dividing numerator by denominator to get the rate.

SOURCE: 2009Q4 - 2010Q3 Inpatient Quality Reporting (formerly Reporting Hospital Quality Data for Annual Payment Update) data

Appendix Table 6-14
Year 2 hospital process of care measures: heart failure, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Discharge instructions	Evaluation LVS function	ACE inhibitor or ARB for LVSD	Adult Smoking Cessation Advice/Co unseling	HF Composite Score
Hunterdon Medical Center					
# patients	121	160	47	18	**346**
% receiving	*85%*	*99%*	*98%*	*100%*	**94%**
Holy Name Hospital					
# patients	233	323	65	26	**647**
% receiving	*100%*	*100%*	*100%*	*100%*	**100%**
Valley Hospital					
# patients	224	315	64	24	**627**
% receiving	*80%*	*99%*	*92%*	*100%*	**92%**
St Francis Medical Center					
# patients	244	300	119	52	**715**
% receiving	*93%*	*100%*	*98%*	*100%*	**97%**
Our Lady of Lourdes Medical Center					
# patients	263	312	113	79	**767**
% receiving	*99%*	*100%*	*100%*	*100%*	**100%**
Somerset Medical Center					
# patients	210	313	78	30	**631**
% receiving	*100%*	*98%*	*100%*	*100%*	**99%**
Overlook Hospital					
# patients	237	356	110	29	**732**
% receiving	*93%*	*97%*	*88%*	*97%*	**94%**
Atlanticare Regional Medical Center					
# patients	465	611	222	133	**1431**
% receiving	*100%*	*100%*	*100%*	*100%*	**100%**
Jersey Shore University Medical Center					
# patients	259	364	128	62	**813**
% receiving	*94%*	*100%*	*98%*	*100%*	**98%**
Monmouth Medical Center					
# patients	197	269	54	38	**558**
% receiving	*99%*	*100%*	*100%*	*100%*	**100%**

(continued)

Appendix Table 6-14 (continued)
Year 2 hospital process of care measures: heart failure, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Discharge instructions	Evaluation LVS function	ACE inhibitor or ARB for LVSD	Adult Smoking Cessation Advice/Co unseling	HF Composite Score
JFK Medical Center					
# patients	436	641	180	73	**1330**
% receiving	*82%*	*100%*	*94%*	*100%*	**93%**
Centrastate Medical Center					
# patients	226	329	76	26	**657**
% receiving	*88%*	*100%*	*99%*	*96%*	**96%**
Comparison Hospitals					
# patients	5570	7889	2035	918	**16412**
% receiving	*92%*	*99%*	*97%*	*100%*	**97%**

NOTE: The composite score is calculated by summing the numerator and denominator for each measure in a topic and then dividing numerator by denominator to get the rate.

SOURCE: 2010Q4 - 2011Q3 Inpatient Quality Reporting (formerly Reporting Hospital Quality Data for Annual Payment Update) data

Appendix Table 6-15
Base Year hospital process of care measures: pneumonia, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Oxygenation assessment	Pneumococcal vaccination	Blood cultures performed in the emergency department prior to initial antibiotic received in hospital	Adult smoking cessation advice/ counseling	Initial antibiotic received within 6 hours of hospital arrival	Initial antibiotic selection for CAP in immune-competent patient	Influenza vaccination	Pneumonia composite score
Hunterdon Medical Center								
# patients	157	145	196	27	163	103	101	—
% receiving	*100%*	*96%*	*96%*	*100%*	*99%*	*94%*	*99%*	**98%**
Holy Name Hospital								
# patients	152	177	173	35	187	110	112	—
% receiving	*100%*	*100%*	*99%*	*100%*	*95%*	*98%*	*100%*	**99%**
Valley Hospital								
# patients	133	186	151	38	141	91	163	—
% receiving	*99%*	*96%*	*96%*	*97%*	*99%*	*90%*	*94%*	**96%**
St Francis Medical Center								
# patients	107	71	120	54	107	67	80	—
% receiving	*100%*	*97%*	*100%*	*100%*	*93%*	*90%*	*98%*	**97%**
Our Lady of Lourdes Medical Center								
# patients	93	121	116	52	115	83	140	—
% receiving	*100%*	*95%*	*94%*	*100%*	*98%*	*98%*	*95%*	**97%**

(continued)

Appendix Table 6-15 (continued)
Base Year hospital process of care measures: pneumonia, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Oxygenation assessment	Pneumococcal vaccination	Blood cultures performed in the emergency department prior to initial antibiotic received in hospital	Adult smoking cessation advice/ counseling	Initial antibiotic received within 6 hours of hospital arrival	Initial antibiotic selection for CAP in immune-competent patient	Influenza vaccination	Pneumonia composite score
Somerset Medical Center								
# patients	151	190	138	43	162	115	170	—
% receiving	*100%*	*91%*	*97%*	*100%*	*96%*	*92%*	*89%*	**94%**
Overlook Hospital								
# patients	174	234	186	40	185	144	240	—
% receiving	*100%*	*98%*	*96%*	*78%*	*97%*	*94%*	*94%*	**96%**
Atlanticare Regional Medical Center								
# patients	253	243	340	107	313	164	280	—
% receiving	*100%*	*100%*	*99%*	*100%*	*97%*	*96%*	*100%*	**99%**
Jersey Shore University Medical Center								
# patients	196	270	215	93	203	162	293	—
% receiving	*100%*	*96%*	*94%*	*99%*	*92%*	*98%*	*88%*	**94%**
Monmouth Medical Center								
# patients	134	146	175	47	141	103	165	—
% receiving	*100%*	*94%*	*96%*	*100%*	*99%*	*92%*	*90%*	**95%**

(continued)

Appendix Table 6-15 (continued)
Base Year hospital process of care measures: pneumonia, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Oxygenation assessment	Pneumococcal vaccination	Blood cultures performed in the emergency department prior to initial antibiotic received in hospital	Adult smoking cessation advice/ counseling	Initial antibiotic received within 6 hours of hospital arrival	Initial antibiotic selection for CAP in immune-competent patient	Influenza vaccination	Pneumonia composite score
JFK Medical Center								
# patients	295	327	357	96	333	216	322	—
% receiving	*100%*	*91%*	*94%*	*94%*	*88%*	*91%*	*84%*	**92%**
Centrastate Medical Center								
# patients	383	420	451	77	365	254	439	—
% receiving	*100%*	*84%*	*98%*	*100%*	*97%*	*95%*	*83%*	**93%**
Comparison Hospitals								
# patients	4135	4364	4549	1330	4280	2874	4424	—
% receiving	*100%*	*93%*	*95%*	*95%*	*95%*	*92%*	*90%*	**94%**

NOTE: The composite score is calculated by summing the numerator and denominator for each measure in a topic and then dividing numerator by denominator to get the rate.

SOURCE: 2007Q4 - 2008Q3 Inpatient Quality Reporting (formerly Reporting Hospital Quality Data for Annual Payment Update) data

Appendix Table 6-16
Year 1 hospital process of care measures: pneumonia, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Oxygenation assessment	Pneumococcal vaccination	Blood cultures performed in the emergency department prior to initial antibiotic received in hospital	Adult smoking cessation advice/ counseling	Initial antibiotic received within 6 hours of hospital arrival	Initial antibiotic selection for CAP in immune-competent patient	Influenza vaccination	Pneumonia composite score
Hunterdon Medical Center								
# patients	157	13	158	23	125	65	44	**685**
% receiving	*100%*	*94%*	*97%*	*100%*	*100%*	*97%*	*91%*	**97%**
Holy Name Hospital								
# patients	152	123	146	27	152	71	52	**723**
% receiving	*100%*	*100%*	*99%*	*100%*	*97%*	*99%*	*100%*	**99%**
Valley Hospital								
# patients	133	129	126	22	117	79	54	**660**
% receiving	*99%*	*98%*	*100%*	*100%*	*94%*	*94%*	*98%*	**98%**
St Francis Medical Center								
# patients	107	76	110	35	101	73	32	**534**
% receiving	*100%*	*93%*	*100%*	*100%*	*94%*	*90%*	*91%*	**96%**
Our Lady of Lourdes Medical Center								
# patients	93	101	103	38	95	68	44	**542**
% receiving	*100%*	*99%*	*99%*	*100%*	*97%*	*97%*	*93%*	**98%**
Somerset Medical Center								
# patients	151	126	97	23	118	91	53	**659**
% receiving	*100%*	*93%*	*99%*	*100%*	*100%*	*97%*	*91%*	**97%**

(continued)

Appendix Table 6-16 (continued)
Year 1 hospital process of care measures: pneumonia, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Oxygenation assessment	Pneumococcal vaccination	Blood cultures performed in the emergency department prior to initial antibiotic received in hospital	Adult smoking cessation advice/ counseling	Initial antibiotic received within 6 hours of hospital arrival	Initial antibiotic selection for CAP in immune-competent patient	Influenza vaccination	Pneumonia composite score
Overlook Hospital								
# patients	174	177	181	25	165	121	74	**917**
% receiving	*100%*	*94%*	*97%*	*100%*	*98%*	*93%*	*99%*	**97%**
Atlanticare Regional Medical Center								
# patients	253	192	307	98	271	160	87	**1368**
% receiving	*100%*	*100%*	*100%*	*100%*	*95%*	*93%*	*100%*	**98%**
Jersey Shore University Medical Center								
# patients	196	146	135	69	125	92	62	**825**
% receiving	*100%*	*96%*	*97%*	*97%*	*97%*	*93%*	*98%*	**97%**
Monmouth Medical Center								
# patients	134	115	130	28	121	103	59	**690**
% receiving	*100%*	*97%*	*100%*	*96%*	*97%*	*91%*	*95%*	**97%**
JFK Medical Center								
# patients	295	294	304	77	321	206	130	**1627**
% receiving	*100%*	*91%*	*94%*	*97%*	*89%*	*93%*	*94%*	**94%**

(continued)

Appendix Table 6-16 (continued)
Year 1 hospital process of care measures: pneumonia, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Oxygenation assessment	Pneumococcal vaccination	Blood cultures performed in the emergency department prior to initial antibiotic received in hospital	Adult smoking cessation advice/ counseling	Initial antibiotic received within 6 hours of hospital arrival	Initial antibiotic selection for CAP in immune-competent patient	Influenza vaccination	Pneumonia composite score
Centrastate Medical Center								
# patients	383	244	265	49	244	146	108	**1435**
% receiving	*100%*	*90%*	*98%*	*100%*	*98%*	*93%*	*90%*	**96%**
Comparison Hospitals								
# patients	—	3260	3722	1194	3434	2408	1649	**15667**
% receiving	—	94%	97%	98%	96%	94%	94%	**96%**

NOTE: The composite score is calculated by summing the numerator and denominator for each measure in a topic and then dividing numerator by denominator to get the rate.

SOURCE: 2009Q4 - 2010Q3 Inpatient Quality Reporting (formerly Reporting Hospital Quality Data for Annual Payment Update) data

Appendix Table 6-17
Year 2 hospital process of care measures: pneumonia, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Oxygenation assessment	Pneumococcal vaccination	Blood cultures performed in the emergency department prior to initial antibiotic received in hospital	Adult smoking cessation advice/ counseling	Initial antibiotic received within 6 hours of hospital arrival	Initial antibiotic selection for CAP in immune-competent patient	Influenza vaccination	Pneumonia composite score
Hunterdon Medical Center								
# patients	—	145	192	31	155	107	45	**675**
% receiving	—	*94%*	*97%*	*94%*	*97%*	*96%*	*89%*	**96%**
Holy Name Hospital								
# patients	—	180	193	29	201	110	54	**767**
% receiving	—	*100%*	*99%*	*100%*	*96%*	*91%*	*100%*	**98%**
Valley Hospital								
# patients	—	156	156	24	152	98	47	**633**
% receiving	—	*99%*	*99%*	*100%*	*98%*	*97%*	*98%*	**98%**
St Francis Medical Center								
# patients	—	88	132	52	132	92	29	**525**
% receiving	—	*93%*	*99%*	*100%*	*92%*	*97%*	*93%*	**96%**
Our Lady of Lourdes Medical Center								
# patients	—	131	141	53	115	77	52	**569**
% receiving	—	*98%*	*99%*	*100%*	*100%*	*100%*	*98%*	**99%**
Somerset Medical Center								
# patients	—	157	112	32	126	91	46	**564**
% receiving	—	*94%*	*98%*	*100%*	*98%*	*95%*	*83%*	**95%**

(continued)

Appendix Table 6-17 (continued)
Year 2 hospital process of care measures: pneumonia, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Oxygenation assessment	Pneumococcal vaccination	Blood cultures performed in the emergency department prior to initial antibiotic received in hospital	Adult smoking cessation advice/ counseling	Initial antibiotic received within 6 hours of hospital arrival	Initial antibiotic selection for CAP in immune-competent patient	Influenza vaccination	Pneumonia composite score
Overlook Hospital								
# patients	—	217	213	43	192	149	73	**887**
% receiving	—	*98%*	*96%*	*91%*	*97%*	*91%*	*100%*	**96%**
Atlanticare Regional Medical Center								
# patients	—	244	346	129	300	195	88	**1302**
% receiving	—	*100%*	*99%*	*100%*	*97%*	*96%*	*100%*	**98%**
Jersey Shore University Medical Center								
# patients	—	235	223	86	218	145	74	**981**
% receiving	—	*96%*	*100%*	*100%*	*99%*	*94%*	*92%*	**97%**
Monmouth Medical Center								
# patients	—	125	163	47	142	95	44	**676**
% receiving	—	*98%*	*99%*	*100%*	*99%*	*98%*	*100%*	**99%**
JFK Medical Center								
# patients	—	398	487	113	485	286	143	**1912**
% receiving	—	*96%*	*98%*	*100%*	*93%*	*94%*	*95%*	**96%**
Centrastate Medical Center								
# patients	—	372	375	74	342	179	133	**1475**
% receiving	—	*98%*	*97%*	*96%*	*99%*	*95%*	*97%*	**97%**

(continued)

Appendix Table 6-17 (continued)
Year 2 hospital process of care measures: pneumonia, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Oxygenation assessment	Pneumococcal vaccination	Blood cultures performed in the emergency department prior to initial antibiotic received in hospital	Adult smoking cessation advice/ counseling	Initial antibiotic received within 6 hours of hospital arrival	Initial antibiotic selection for CAP in immune-competent patient	Influenza vaccination	Pneumonia composite score
Comparison Hospitals								
# patients	—	4558	4925	1358	4552	2858	1570	**19821**
% receiving	—	96%	98%	100%	97%	96%	96%	**97%**

NOTE: The composite score is calculated by summing the numerator and denominator for each measure in a topic and then dividing numerator by denominator to get the rate.

SOURCE: 2010Q4 - 2011Q3 Inpatient Quality Reporting (formerly Reporting Hospital Quality Data for Annual Payment Update) data

Appendix Table 6-18
Base Year hospital process of care measures: surgical care improvement project, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Prophylactic Antibiotic Received Within 1 Hour Prior to Surgical Incision	Prophylactic Antibiotic Selection for Surgical Patients	Prophylactic Antibiotics Discontinued Within 24 Hours After Surgery End Time	Surgery Patients with Appropriate Hair Removal	Surgery Patients with Recommended Venous Thromboembolism Prophylaxis Ordered	SCIP Composite Score
Hunterdon Medical Center						
# patients	271	272	268	316	350	**1477**
% receiving	*98%*	*100%*	*95%*	*99%*	*88%*	**96%**
Holy Name Hospital						
# patients	325	329	304	419	429	**1806**
% receiving	*98%*	*98%*	*97%*	*100%*	*96%*	**98%**
Valley Hospital						
# patients	551	559	485	617	444	**2656**
% receiving	*97%*	*98%*	*95%*	*100%*	*92%*	**97%**
St Francis Medical Center						
# patients	196	198	177	368	187	**1126**
% receiving	*94%*	*96%*	*91%*	*99%*	*89%*	**95%**
Our Lady of Lourdes Medical Center						
# patients	465	471	430	508	366	**2240**
% receiving	*99%*	*99%*	*94%*	*98%*	*99%*	**98%**
Somerset Medical Center						
# patients	324	327	321	403	396	**1771**
% receiving	*98%*	*99%*	*93%*	*100%*	*85%*	**95%**
Overlook Hospital						
# patients	348	348	341	439	456	**1932**
% receiving	*98%*	*97%*	*93%*	*100%*	*98%*	**97%**
Atlanticare Regional Medical Center						
# patients	482	496	391	714	595	**2678**
% receiving	*96%*	*99%*	*95%*	*100%*	*97%*	**98%**

(continued)

Appendix Table 6-18 (continued)
Base Year hospital process of care measures: surgical care improvement project, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Prophylactic Antibiotic Received Within 1 Hour Prior to Surgical Incision	Prophylactic Antibiotic Selection for Surgical Patients	Prophylactic Antibiotics Discontinued Within 24 Hours After Surgery End Time	Surgery Patients with Appropriate Hair Removal	Surgery Patients with Recommended Venous Thromboembolism Prophylaxis Ordered	SCIP Composite Score
Jersey Shore University Medical Center						
# patients	842	870	813	894	592	**4011**
% receiving	*98%*	*96%*	*91%*	*99%*	*97%*	**96%**
Monmouth Medical Center						
# patients	342	342	317	416	433	**1850**
% receiving	*92%*	*99%*	*93%*	*98%*	*99%*	**96%**
JFK Medical Center						
# patients	677	680	631	755	848	**3591**
% receiving	*93%*	*98%*	*88%*	*92%*	*89%*	**92%**
Centrastate Medical Center						
# patients	425	426	408	579	568	**2406**
% receiving	*92%*	*92%*	*89%*	*93%*	*79%*	**89%**
Comparison Hospitals						
# patients	5014	5044	4722	6433	6239	**27452**
% receiving	*95%*	*95%*	*92%*	*97%*	*91%*	**94%**

NOTE: The composite score is calculated by summing the numerator and denominator for each measure in a topic and then dividing numerator by denominator to get the rate.

SOURCE: 2007Q4 - 2008Q3 Inpatient Quality Reporting (formerly Reporting Hospital Quality Data for Annual Payment Update) data

Appendix Table 6-19
Year 1 hospital process of care measures: surgical care improvement project, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Prophylactic Antibiotic Received Within 1 Hour Prior to Surgical Incision	Prophylactic Antibiotic Selection for Surgical Patients	Prophylactic Antibiotics Discontinued Within 24 Hours After Surgery End Time	Surgery Patients with Appropriate Hair Removal	Surgery Patients with Recommended Venous Thromboembolism Prophylaxis Ordered	SCIP Composite Score
Hunterdon Medical Center						
# patients	291	289	286	418	139	**1423**
% receiving	*98%*	*99%*	*97%*	*100%*	*96%*	**98%**
Holy Name Hospital						
# patients	290	296	270	518	238	**1612**
% receiving	*100%*	*99%*	*99%*	*100%*	*98%*	**99%**
Valley Hospital						
# patients	538	549	519	807	219	**2632**
% receiving	*98%*	*97%*	*95%*	*100%*	*94%*	**97%**
St Francis Medical Center						
# patients	167	175	152	332	117	**943**
% receiving	*96%*	*98%*	*87%*	*100%*	*98%*	**97%**
Our Lady of Lourdes Medical Center						
# patients	317	324	292	516	152	**1601**
% receiving	*99%*	*98%*	*94%*	*100%*	*100%*	**98%**
Somerset Medical Center						
# patients	338	339	322	541	220	**1760**
% receiving	*100%*	*98%*	*96%*	*100%*	*99%*	**99%**
Overlook Hospital						
# patients	371	378	364	577	209	**1899**
% receiving	*99%*	*97%*	*96%*	*100%*	*99%*	**98%**
Atlanticare Regional Medical Center						
# patients	546	560	502	1054	285	**2947**
% receiving	*97%*	*98%*	*92%*	*100%*	*97%*	**97%**

(continued)

Appendix Table 6-19 (continued)
Year 1 hospital process of care measures: surgical care improvement project, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Prophylactic Antibiotic Received Within 1 Hour Prior to Surgical Incision	Prophylactic Antibiotic Selection for Surgical Patients	Prophylactic Antibiotics Discontinued Within 24 Hours After Surgery End Time	Surgery Patients with Appropriate Hair Removal	Surgery Patients with Recommended Venous Thromboembolism Prophylaxis Ordered	SCIP Composite Score
Jersey Shore University Medical Center						
# patients	826	846	774	1179	254	**3879**
% receiving	*99%*	*98%*	*96%*	*100%*	*96%*	**98%**
Monmouth Medical Center						
# patients	326	328	312	523	192	**1681**
% receiving	*99%*	*97%*	*97%*	*100%*	*98%*	**98%**
JFK Medical Center						
# patients	762	763	747	959	413	**3644**
% receiving	*96%*	*96%*	*92%*	*98%*	*91%*	**95%**
Centrastate Medical Center						
# patients	415	418	402	716	284	**2235**
% receiving	*97%*	*93%*	*92%*	*99%*	*81%*	**94%**
Comparison Hospitals						
# patients	6028	6056	5746	9622	3437	**30889**
% receiving	*98%*	*98%*	*97%*	*99%*	*96%*	**98%**

NOTE: The composite score is calculated by summing the numerator and denominator for each measure in a topic and then dividing numerator by denominator to get the rate.

SOURCE: 2009Q4 - 2010Q3 Inpatient Quality Reporting (formerly Reporting Hospital Quality Data for Annual Payment Update) data

Appendix Table 6-20
Year 2 hospital process of care measures: surgical care improvement project, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Prophylactic Antibiotic Received Within 1 Hour Prior to Surgical Incision	Prophylactic Antibiotic Selection for Surgical Patients	Prophylactic Antibiotics Discontinued Within 24 Hours After Surgery End Time	Surgery Patients with Appropriate Hair Removal	Surgery Patients with Recommended Venous Thromboembolism Prophylaxis Ordered	SCIP Composite Score
Hunterdon Medical Center						
# patients	269	270	266	402	140	**1347**
% receiving	*99%*	*98%*	*99%*	*100%*	*95%*	**99%**
Holy Name Hospital						
# patients	287	291	271	489	247	**1585**
% receiving	*98%*	*98%*	*97%*	*100%*	*100%*	**99%**
Valley Hospital						
# patients	509	519	497	769	235	**2529**
% receiving	*99%*	*97%*	*96%*	*100%*	*92%*	**98%**
St Francis Medical Center						
# patients	153	161	149	283	122	**868**
% receiving	*96%*	*99%*	*91%*	*100%*	*96%*	**97%**
Our Lady of Lourdes Medical Center						
# patients	337	341	327	540	142	**1687**
% receiving	*100%*	*99%*	*96%*	*100%*	*100%*	**99%**
Somerset Medical Center						
# patients	323	327	312	521	194	**1677**
% receiving	*98%*	*100%*	*99%*	*99%*	*98%*	**99%**
Overlook Hospital						
# patients	327	331	323	505	188	**1674**
% receiving	*99%*	*98%*	*98%*	*100%*	*99%*	**99%**
Atlanticare Regional Medical Center						
# patients	554	572	531	1059	303	**3019**
% receiving	*96%*	*96%*	*94%*	*100%*	*96%*	**97%**

(continued)

Appendix Table 6-20 (continued)
Year 2 hospital process of care measures: surgical care improvement project, PHC hospitals and their comparison group

Hospital name, number of patients, and percent receiving	Prophylactic Antibiotic Received Within 1 Hour Prior to Surgical Incision	Prophylactic Antibiotic Selection for Surgical Patients	Prophylactic Antibiotics Discontinued Within 24 Hours After Surgery End Time	Surgery Patients with Appropriate Hair Removal	Surgery Patients with Recommended Venous Thromboembolism Prophylaxis Ordered	SCIP Composite Score
Jersey Shore University Medical Center						
# patients	816	848	779	1139	270	**3852**
% receiving	*99%*	*99%*	*97%*	*100%*	*98%*	**99%**
Monmouth Medical Center						
# patients	323	323	309	515	171	**1641**
% receiving	*100%*	*98%*	*98%*	*100%*	*99%*	**99%**
JFK Medical Center						
# patients	783	786	771	1012	435	**3787**
% receiving	*97%*	*96%*	*94%*	*100%*	*92%*	**96%**
Centrastate Medical Center						
# patients	362	363	353	660	265	**2003**
% receiving	*97%*	*96%*	*94%*	*99%*	*85%*	**95%**
Comparison Hospitals						
# patients	5787	5815	5625	9202	3477	**29906**
% receiving	*98%*	*98%*	*97%*	*100%*	*96%*	**98%**

NOTE: The composite score is calculated by summing the numerator and denominator for each measure in a topic and then dividing numerator by denominator to get the rate.

SOURCE: 2010Q4 - 2011Q3 Inpatient Quality Reporting (formerly Reporting Hospital Quality Data for Annual Payment Update) data

Appendix Table 6-21
Logistic Regression Results (Odds Ratio) for 30-day Mortality, 90-day mortality, 90-day readmissions, Inpatient Quality Indicators and Patient Safety Indicators. Full Specification with Individual Year 2D Estimators

	30-day Mortality			90-day Mortality			90-day Readmissions			Inpatient Quality Indicators			Patient Safety Indicators		
Explanatory variable	Coef.	Robust Std. Err.	P > | t |	Coef.	Robust Std. Err.	P > | t |	Coef.	Robust Std. Err.	P > | t |	Coef.	Robust Std. Err.	P > | t |	Coef.	Robust Std. Err.	P > | t |
Patient age 0 to 64	0.785	0.047	0.000	0.769	0.037	0.000	1.348	0.028	0.000	0.847	0.114	0.214	0.814	0.094	0.074
Patient age 70 to 74	1.191	0.043	0.000	1.177	0.032	0.000	1.040	0.013	0.002	1.021	0.088	0.812	0.944	0.067	0.416
Patient age 75 to 79	1.515	0.044	0.000	1.511	0.036	0.000	1.117	0.020	0.000	1.241	0.097	0.006	1.076	0.075	0.293
Patient age 80 plus	2.647	0.073	0.000	2.665	0.066	0.000	1.200	0.018	0.000	1.637	0.104	0.000	1.208	0.084	0.007
Female	0.791	0.012	0.000	0.766	0.009	0.000	0.905	0.007	0.000	0.866	0.017	0.000	1.107	0.038	0.003
Non-white	0.839	0.025	0.000	0.930	0.029	0.022	1.043	0.015	0.003	0.708	0.050	0.000	0.912	0.067	0.212
DRG weight	0.491	0.012	0.000	0.522	0.010	0.000	0.771	0.015	0.000	0.770	0.028	0.000	0.456	0.038	0.000
HCC risk score	1.004	0.001	0.006	1.007	0.001	0.000	1.016	0.001	0.000	0.993	0.003	0.016	1.018	0.002	0.000
Participating hospital indicator	1.016	0.078	0.840	1.005	0.076	0.944	1.018	0.033	0.592	1.156	0.125	0.179	1.062	0.134	0.632
Average LOS for DRG	1.552	0.021	0.000	1.530	0.016	0.000	1.164	0.008	0.000	1.286	0.019	0.000	1.669	0.063	0.000
IPPS area wage index	1.038	0.438	0.930	1.440	0.580	0.365	1.070	0.200	0.716	1.007	0.537	0.990	2.440	1.550	0.160
Intern/resident to bed ratio	0.921	0.381	0.843	1.079	0.450	0.856	0.949	0.150	0.742	1.027	0.572	0.961	1.105	0.584	0.851
Hospital beds	1.000	0.000	0.239	1.000	0.000	0.149	1.000	0.000	0.583	0.999	0.000	0.295	1.000	0.000	0.966
DSH adjustment factor (operating)	0.922	0.742	0.919	0.841	0.669	0.828	2.623	0.808	0.002	2.648	3.567	0.470	1.869	1.889	0.536
Performance Year 1 Indicator	1.105	0.050	0.029	1.069	0.038	0.060	0.980	0.015	0.167	1.068	0.121	0.563	0.438	0.043	0.000
Performance Year 2 Indicator	1.230	0.059	0.000	1.192	0.048	0.000	1.017	0.024	0.485	1.119	0.136	0.356	0.604	0.045	0.000
Performance Year 3 Indicator	1.324	0.077	0.000	1.235	0.064	0.000	0.989	0.025	0.673	1.240	0.164	0.104	0.653	0.056	0.000
Performance Year 1 2D estimator	0.963	0.062	0.561	1.006	0.054	0.914	0.988	0.029	0.681	0.882	0.116	0.341	1.211	0.216	0.284
Performance Year 2 2D estimator	0.999	0.060	0.984	1.001	0.055	0.984	0.964	0.034	0.304	0.973	0.127	0.832	1.028	0.188	0.881
Performance Year 3 2D estimator	1.006	0.085	0.946	1.034	0.072	0.634	0.982	0.033	0.582	0.824	0.113	0.158	1.120	0.141	0.371
Constant term	0.007	0.004	0.000	0.008	0.004	0.000	0.199	0.044	0.000	0.017	0.011	0.000	0.001	0.001	0.000
Pseudo R^2	0.0965	—	—	0.1058	—	—	0.0181	—	—	0.0455	—	—	0.1549	—	—
Number of observations	404,981	—	—	404,981	—	—	404,981	—	—	72,150	—	—	321,683	—	—

Appendix Table 6-22
Logistic Regression Results (Odds Ratio) for 30-day Mortality, 90-day mortality, 90-day readmissions, Inpatient Quality Indicators and Patient Safety Indicators. Full Specification with Pooled Performance 2D Estimators

	30-day Mortality			90-day Mortality			90-day Readmissions			Inpatient Quality Indicators			Patient Safety Indicators		
Explanatory variable	Coef.	Std. Err.	P > | t |	Coef.	Std. Err.	P > | t |	Coef.	Std. Err.	P > | t |	Coef.	Std. Err.	P > | t |	Coef.	Std. Err.	P > | t |
Patient age 0 to 64	0.786	0.048	0.000	0.770	0.038	0.000	1.355	0.028	0.000	0.852	0.112	0.225	0.814	0.094	0.076
Patient age 70 to 74	1.191	0.043	0.000	1.177	0.032	0.000	1.038	0.013	0.002	1.018	0.088	0.839	0.939	0.066	0.368
Patient age 75 to 79	1.517	0.046	0.000	1.514	0.038	0.000	1.114	0.020	0.000	1.239	0.096	0.006	1.069	0.073	0.326
Patient age 80 plus	2.662	0.079	0.000	2.682	0.071	0.000	1.194	0.018	0.000	1.636	0.108	0.000	1.200	0.081	0.007
Female	0.790	0.012	0.000	0.766	0.010	0.000	0.905	0.007	0.000	0.866	0.017	0.000	1.106	0.038	0.003
Non-white	0.838	0.021	0.000	0.929	0.024	0.003	1.060	0.017	0.000	0.721	0.052	0.000	0.923	0.067	0.266
DRG weight	0.496	0.012	0.000	0.525	0.010	0.000	0.774	0.014	0.000	0.773	0.028	0.000	0.464	0.037	0.000
HCC risk score	1.004	0.001	0.004	1.007	0.001	0.000	1.016	0.001	0.000	0.993	0.003	0.014	1.018	0.002	0.000
Participating hospital indicator	1.022	0.070	0.745	1.005	0.066	0.935	1.012	0.037	0.738	1.144	0.102	0.130	1.048	0.127	0.699
Performance year Indicator	1.202	0.052	0.000	1.152	0.041	0.000	0.986	0.015	0.362	1.120	0.124	0.304	0.545	0.040	0.000
Performance Year 2D estimator	0.982	0.062	0.771	1.006	0.055	0.907	0.976	0.025	0.344	0.877	0.117	0.328	1.115	0.164	0.458
IPPS area wage index	0.916	0.336	0.810	1.204	0.406	0.583	0.964	0.191	0.851	0.679	0.408	0.519	2.179	0.940	0.071
Average LOS for DRG	1.544	0.020	0.000	1.525	0.016	0.000	1.162	0.008	0.000	1.284	0.018	0.000	1.655	0.061	0.000
Constant term	0.007	0.003	0.000	0.009	0.004	0.000	0.240	0.061	0.000	0.024	0.019	0.000	0.001	0.001	0.000
Pseudo R^2	0.0957	—	—	0.1051	—	—	0.0177	—	—	0.0446	—	—	0.1537	—	—
Number of observations	404,981	—	—	404,981	—	—	404,981	—	—	72,150	—	—	321,683	—	—

Appendix Table 8-1
Share of admissions through the emergency room at participating and comparison hospitals, base year and performance years (PY)

Hospital	Percent by time period			
	Base Year	PY 1	PY 2	PY 3
Hunterdon Medical Center	76.4	84.3	83.9	83.0
Holy Name Hospital	73.6	76.8	75.9	75.2
Valley Hospital	72.1	73.9	77.5	79.7
St. Francis Medical Center	69.8	61.8	64.1	80.6
Our Lady of Lourdes Medical Center	68.8	76.6	78.0	76.8
Somerset Medical Center	69.4	78.1	82.6	84.1
Overlook Hospital	78.2	75.1	77.9	76.6
Atlanticare Regional Medical Center	75.9	78.0	78.1	76.7
Jersey Shore University Medical Center	66.8	72.5	74.8	74.1
Monmouth Medical Center	76.3	81.2	79.8	65.9
JFK Medical Center	81.8	81.1	84.1	82.3
Centrastate Medical Center	86.5	83.9	84.8	85.9
Comparison Hospitals	76.6	77.9	79.8	78.9

SOURCE: RTI processing of Medicare claims.

PY1: run_yr1_bbstat005_v2_part2_(table 8-3)

PY2: run_yr2_bbstat005_v2_part2_(table 8-3)

PY3: run_yr3_bbstat005_v2_part2_(table 8-3)

Appendix Table 8-2
Share of admissions with cost outliers at participating and comparison hospitals, base year and performance years (PY)

Hospital	Percent by time period			
	Base Year	PY 1	PY 2	PY 3
Hunterdon Medical Center	2.56	4.25	2.45	3.43
Holy Name Hospital	0.44	0.59	0.42	0.47
Valley Hospital	1.73	2.16	1.51	1.36
St. Francis Medical Center	1.47	0.80	0.78	1.86
Our Lady of Lourdes Medical Center	1.04	0.88	0.93	1.08
Somerset Medical Center	1.13	3.04	7.16	2.93
Overlook Hospital	1.62	1.36	1.23	2.32
Atlanticare Regional Medical Center	2.74	2.34	1.48	2.97
Jersey Shore University Medical Center	1.36	1.38	1.28	1.74
Monmouth Medical Center	0.72	0.43	0.39	0.50
JFK Medical Center	0.46	0.58	0.35	0.31
Centrastate Medical Center	0.44	0.25	0.43	0.36
Comparison Hospitals	1.19	1.37	1.42	1.47

SOURCE: RTI processing of Medicare claims.

PY1 run_yr1_bbstat005_v2_part3_(table 8-4)

PY2 run_yr2_bbstat005_v2_part3_(table 8-4)

PY3 run_yr3_bbstat005_v2_part3_(table 8-4)

Appendix Table 8-3
Share of inpatient admissions classified as major or extreme severity at participating and comparison hospitals, base year and performance years (PY)

Hospital	Percent by time period			
	Base Year	PY 1	PY 2	PY 3
Hunterdon Medical Center	33.4	39.7	46.2	50.8
Holy Name Hospital	31.9	33.1	36.1	42.0
Valley Hospital	31.4	29.9	33.5	36.0
St. Francis Medical Center	32.1	32.9	37.2	45.9
Our Lady of Lourdes Medical Center	36.2	44.6	50.2	51.6
Somerset Medical Center	33.5	33.4	38.6	48.2
Overlook Hospital	38.3	40.5	47.0	50.7
Atlanticare Regional Medical Center	36.0	38.1	40.8	43.5
Jersey Shore University Medical Center	34.8	36.9	43.2	51.8
Monmouth Medical Center	30.0	33.6	39.8	42.6
JFK Medical Center	32.9	39.5	39.1	41.0
Centrastate Medical Center	31.6	41.0	45.9	48.0
Comparison Hospitals	33.2	37.9	40.7	41.8

SOURCE: RTI processing of Medicare claims.

run_yr1_bbstat006_(table 8-5)

run_yr2_bbstat006_(table 8-5)

run_yr3_bbstat006_(table 8-5)

Appendix Table 8-4
Total transfer rates of discharges from participating and comparison hospitals, base year and performance years (PY)

Hospital	Percent by time period			
	Base Year	PY 1	PY 2	PY 3
Hunterdon Medical Center	30.1	29.8	30.5	30.7
Holy Name Hospital	29.7	31.2	31.5	33.9
Valley Hospital	27.3	29.7	31.8	34.2
St. Francis Medical Center	21.0	22.4	22.8	27.2
Our Lady of Lourdes Medical Center	20.1	21.5	24.8	25.2
Somerset Medical Center	33.8	32.8	32.3	35.7
Overlook Hospital	31.9	34.1	33.5	35.5
Atlanticare Regional Medical Center	27.8	30.5	29.9	30.9
Jersey Shore University Medical Center	29.0	31.3	34.2	37.5
Monmouth Medical Center	30.7	32.7	33.7	33.6
JFK Medical Center	31.0	39.7	40.1	42.2
Centrastate Medical Center	33.0	37.0	35.1	36.4
Comparison Hospitals	30.4	31.9	32.4	32.7

SOURCE: RTI processing of Medicare claims.

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run_yr2_pgm6_phc_formatted_table

run_yr3_pgm6_phc_formatted_table

Appendix Table 8-5
Transfer rates from participating and comparison hospitals to short-term acute-care hospitals, base year and performance years (PY)

Hospital	Percent by time period			
	Base Year	PY 1	PY 2	PY 3
Hunterdon Medical Center	3.7	3.8	3.4	3.4
Holy Name Hospital	2.6	2.5	1.9	2.0
Valley Hospital	0.6	0.8	0.8	0.9
St. Francis Medical Center	1.3	0.9	1.6	1.7
Our Lady of Lourdes Medical Center	0.7	0.7	0.9	1.2
Somerset Medical Center	2.0	1.9	2.0	2.0
Overlook Hospital	2.8	1.9	1.9	1.8
Atlanticare Regional Medical Center	1.3	1.4	1.1	0.9
Jersey Shore University Medical Center	0.6	0.5	0.6	0.7
Monmouth Medical Center	2.6	3.3	3.1	3.7
JFK Medical Center	3.7	3.1	3.3	2.8
Centrastate Medical Center	3.7	3.9	4.2	4.6
Comparison Hospitals	3.0	2.9	2.6	2.5

SOURCE: RTI processing of Medicare claims.

run_yr1_pgm6_phc_formatted_table

run_yr2_pgm6_phc_formatted_table

run_yr3_pgm6_phc_formatted_table

Appendix Table 8-6
Share of transfers that were classified major or extreme severity, from participating and comparison hospitals, to short-term acute-care hospitals, base year and performance years (PY)

Hospital	Percent by time period			
	Base Year	PY 1	PY 2	PY 3
Hunterdon Medical Center	32.1	33.8	39.7	58.0
Holy Name Hospital	40.6	42.3	43.4	45.1
Valley Hospital	22.4	19.1	16.9	31.9
St. Francis Medical Center	33.3	36.4	37.5	68.8
Our Lady of Lourdes Medical Center	48.0	50.0	52.0	61.3
Somerset Medical Center	42.0	48.1	53.7	48.6
Overlook Hospital	39.1	36.7	57.4	56.4
Atlanticare Regional Medical Center	58.4	61.0	59.1	63.5
Jersey Shore University Medical Center	40.0	51.6	41.7	62.5
Monmouth Medical Center	44.6	38.8	50.0	50.5
JFK Medical Center	31.9	45.9	50.4	43.9
Centrastate Medical Center	31.2	39.5	49.3	54.2
Comparison Hospitals	36.4	42.3	44.6	46.8

SOURCE: RTI processing of Medicare claims.

run_yr1_pgm6_phc_formatted_table

run_yr2_pgm6_phc_formatted_table

run_yr3_pgm6_phc_formatted_table

Appendix Table 8-7
Probability of admission classified as major or extreme severity (basic 2D model)

Explanatory Variable	Model 1 hospital characteristics			Model 2 Model 1 plus patient characteristics		
	Coefficient	Robust Standard Error	P values	Coefficient	Robust Standard Error	P values
Patient age 0-64	—	—	—	0.188	0.024	0.000
Patient age 70-74	—	—	—	0.149	0.016	0.000
Patient age 75-79	—	—	—	0.248	0.014	0.000
Patient age 80 or more	—	—	—	0.495	0.021	0.000
Female	—	—	—	-0.220	0.013	0.000
Nonwhite	—	—	—	0.127	0.031	0.000
Admission from a skilled nursing facility	—	—	—	0.095	0.053	0.074
Admission through the emergency room	—	—	—	1.617	0.060	0.000
Diagnosis-related group weight	—	—	—	0.866	0.050	0.000
HCC risk score	—	—	—	0.042	0.003	0.000
Intern/Resident to bed ratio	0.179	0.353	0.613	0.429	0.350	0.220
Hospital beds	0.000	0.000	0.634	0.000	0.000	0.714
DSH adjustment factor (operating)	0.618	0.565	0.274	0.701	0.500	0.161
Participating hospital indicator	0.033	0.059	0.574	0.006	0.063	0.929
Performance period indicator	0.301	0.042	0.000	0.281	0.036	0.000
Difference-in-difference estimator	0.005	0.063	0.936	0.018	0.060	0.765
Constant term	-0.794	0.104	0.000	-3.622	0.121	0.000
Pseudo R^2	0.0035	—	—	0.1396	—	—
Number of observations	404,214	—	—	404,214	—	—

SOURCE: RTI analysis of Medicare Claims

Output: gain2_request1_jul09_wa055

Appendix Table 8-8
Probability of admission classified as major or extreme severity (linear time trend 2D model)

Explanatory Variable	Model 1 hospital characteristics			Model 2 Model 1 plus patient characteristics		
	Coefficient	Robust Standard Error	P values	Coefficient	Robust Standard Error	P values
Patient age 0-64	—	—	—	0.188	0.025	0.000
Patient age 70-74	—	—	—	0.152	0.016	0.000
Patient age 75-79	—	—	—	0.253	0.015	0.000
Patient age 80 or more	—	—	—	0.499	0.021	0.000
Female	—	—	—	-0.220	0.013	0.000
Nonwhite	—	—	—	0.126	0.030	0.000
Admission from a skilled nursing facility	—	—	—	0.091	0.046	0.048
Admission through the emergency room	—	—	—	1.617	0.060	0.000
Diagnosis-related group weight	—	—	—	0.866	0.050	0.000
HCC risk score	—	—	—	0.042	0.003	0.000
Intern/Resident to bed ratio	0.173	0.351	0.623	0.422	0.350	0.228
Hospital beds	0.000	0.000	0.674	0.000	0.000	0.663
DSH adjustment factor (operating)	0.688	0.564	0.223	0.789	0.493	0.110
Participating hospital indicator	-0.025	0.060	0.673	-0.058	0.064	0.368
Performance period indicator	0.124	0.019	0.000	0.119	0.014	0.000
Difference-in-difference estimator	0.042	0.027	0.116	0.052	0.025	0.038
Constant term	-0.751	0.102	0.000	-3.589	0.123	0.000
Pseudo R^2	0.0051	—	—	0.1411	—	—
Number of observations	404,214	—	—	404,214	—	—

SOURCE: RTI analysis of Medicare Claims

Output: gain2_request1_jul03

Appendix Table 8-9
Probability of admission classified as major or extreme severity (year-specific 2D model)

Explanatory Variable	Model 1 hospital characteristics			Model 2 Model 1 plus patient characteristics		
	Coefficient	Robust Standard Error	P values	Coefficient	Robust Standard Error	P values
Patient age 0-64	—	—	—	0.188	0.025	0.000
Patient age 70-74	—	—	—	0.151	0.016	0.000
Patient age 75-79	—	—	—	0.253	0.015	0.000
Patient age 80 or more	—	—	—	0.499	0.021	0.000
Female	—	—	—	-0.220	0.013	0.000
Nonwhite	—	—	—	0.127	0.030	0.000
Admission from a skilled nursing facility	—	—	—	0.092	0.046	0.045
Admission through the emergency room	—	—	—	1.617	0.060	0.000
Diagnosis-related group weight	—	—	—	0.866	0.050	0.000
HCC risk score	—	—	—	0.042	0.003	0.000
Intern/Resident to bed ratio	0.173	0.353	0.623	0.424	0.350	0.225
Hospital beds	0.000	0.000	0.674	0.000	0.000	0.662
DSH adjustment factor (operating)	0.687	0.557	0.217	0.787	0.490	0.108
Participating hospital indicator	0.033	0.059	0.579	0.005	0.063	0.934
Performance Year 1 Indicator	0.210	0.041	0.000	0.192	0.042	0.000
Performance Year 2 Indicator	0.322	0.041	0.000	0.297	0.037	0.000
Performance Year 3 Indicator	0.375	0.057	0.000	0.359	0.043	0.000
Performance Year 1 2D estimator	-0.086	0.062	0.164	-0.091	0.060	0.131
Performance Year 2 2D estimator	-0.010	0.064	0.871	0.009	0.062	0.881
Performance Year 3 2D estimator	0.117	0.083	0.157	0.140	0.077	0.070
Constant term	-0.792	0.104	0.000	-3.623	0.122	0.000
Pseudo R^2	0.0052	—	—	0.1412	—	—
Number of observations	404,214	—	—	404,214	—	—

SOURCE: RTI analysis of Medicare Claims

Output: gain2_request1_jul09_wa056

Appendix Table 8-10
Probability of an IPPS transfer (basic 2D model)

Explanatory Variable	Model 1 hospital characteristics			Model 2 Model 1 plus patient characteristics		
	Coefficient	Robust Standard Error	P values	Coefficient	Robust Standard Error	P values
Patient age 0-64	—	—	—	-0.355	0.045	0.000
Patient age 70-74	—	—	—	-0.041	0.030	0.170
Patient age 75-79	—	—	—	-0.044	0.034	0.204
Patient age 80 or more	—	—	—	-0.603	0.044	0.000
Female	—	—	—	-0.424	0.052	0.000
Nonwhite	—	—	—	-0.189	0.061	0.002
Admission from a skilled nursing facility	—	—	—	-0.981	0.127	0.000
Admission through the emergency room	—	—	—	0.646	0.179	0.000
Diagnosis-related group weight	—	—	—	-0.023	0.017	0.172
HCC risk score	—	—	—	-0.028	0.004	0.000
Intern/Resident to bed ratio	0.183	0.742	0.805	0.287	0.686	0.676
Hospital beds	-0.003	0.000	0.000	-0.003	0.000	0.000
DSH adjustment factor (operating)	1.391	1.137	0.221	1.493	1.190	0.210
Participating hospital indicator	-0.511	0.204	0.012	-0.505	0.203	0.013
Performance period indicator	-0.141	0.039	0.000	-0.138	0.039	0.000
Difference-in-difference estimator	0.174	0.092	0.059	0.163	0.090	0.070
Constant term	-2.579	0.184	0.000	-2.437	0.215	0.000
Pseudo R^2	0.0163	—	—	0.0378	—	—
Number of observations	404,214	—	—	404,214	—	—

SOURCE: RTI analysis of Medicare Claims

Output: gain2_request1_jul09_wa055

Appendix Table 8-11
Probability of an IPPS transfer (linear time trend 2D model)

Explanatory Variable	Model 1 hospital characteristics			Model 2 Model 1 plus patient characteristics		
	Coefficient	Robust Standard Error	P values	Coefficient	Robust Standard Error	P values
Patient age 0-64	—	—	—	-0.355	0.045	0.000
Patient age 70-74	—	—	—	-0.042	0.030	0.158
Patient age 75-79	—	—	—	-0.045	0.034	0.190
Patient age 80 or more	—	—	—	-0.603	0.044	0.000
Female	—	—	—	-0.424	0.052	0.000
Nonwhite	—	—	—	-0.188	0.061	0.002
Admission from a skilled nursing facility	—	—	—	-0.974	0.129	0.000
Admission through the emergency room	—	—	—	0.646	0.179	0.000
Diagnosis-related group weight	—	—	—	-0.023	0.017	0.177
HCC risk score	—	—	—	-0.028	0.004	0.000
Intern/Resident to bed ratio	0.193	0.738	0.794	0.299	0.683	0.662
Hospital beds	-0.003	0.000	0.000	-0.003	0.000	0.000
DSH adjustment factor (operating)	1.382	1.130	0.221	1.482	1.183	0.211
Participating hospital indicator	-0.530	0.194	0.006	-0.523	0.192	0.006
Performance period indicator	-0.079	0.018	0.000	-0.078	0.019	0.000
Difference-in-difference estimator	0.103	0.038	0.007	0.097	0.037	0.010
Constant term	-2.564	0.178	0.000	-2.422	0.211	0.000
Pseudo R^2	0.0165	—	—	0.0381	—	—
Number of observations	404,214	—	—	404,214	—	—

SOURCE: RTI analysis of Medicare Claims

Output: gain2_request1_jul03

Appendix Table 8-12
Probability of IPPS transfer (year-specific 2D model)

	Model 1 hospital characteristics			Model 2 Model 1 plus patient characteristics		
Explanatory Variable	Coefficient	Robust Standard Error	P values	Coefficient	Robust Standard Error	P values
Patient age 0-64	—	—	—	-0.355	0.045	0.000
Patient age 70-74	—	—	—	-0.043	0.030	0.157
Patient age 75-79	—	—	—	-0.045	0.034	0.190
Patient age 80 or more	—	—	—	-0.603	0.044	0.000
Female	—	—	—	-0.424	0.052	0.000
Nonwhite	—	—	—	-0.188	0.061	0.002
Admission from a skilled nursing facility	—	—	—	-0.970	0.130	0.000
Admission through the emergency room	—	—	—	0.646	0.179	0.000
Diagnosis-related group weight	—	—	—	-0.023	0.017	0.177
HCC risk score	—	—	—	-0.028	0.004	0.000
Intern/Resident to bed ratio	0.199	0.737	0.787	0.305	0.682	0.655
Hospital beds	-0.003	0.000	0.000	-0.003	0.000	0.000
DSH adjustment factor (operating)	1.387	1.134	0.222	1.486	1.188	0.211
Participating hospital indicator	-0.511	0.204	0.012	-0.504	0.203	0.013
Performance Year 1 Indicator	-0.033	0.049	0.496	-0.034	0.047	0.478
Performance Year 2 Indicator	-0.186	0.050	0.000	-0.182	0.052	0.000
Performance Year 3 Indicator	-0.214	0.054	0.000	-0.210	0.055	0.000
Performance Year 1 2D estimator	0.038	0.093	0.684	0.035	0.092	0.707
Performance Year 2 2D estimator	0.214	0.093	0.022	0.200	0.091	0.027
Performance Year 3 2D estimator	0.285	0.119	0.017	0.268	0.117	0.022
Constant term	-2.574	0.184	0.000	-2.432	0.214	0.000
Pseudo R^2	0.0166	—	—	0.0381	—	—
Number of observations	404,214	—	—	404,214	—	—

SOURCE: RTI analysis of Medicare Claims

Output: gain2_request1_jul09_wa056