

**Evaluation of the Business Case
for Quality, Phase II: Monroe Case
Study**

May 2013

Mathematica:
Kristin Andrews
Dominick Esposito
Erin Taylor
Keith Kranker

University of North Carolina, Chapel Hill:
Sandra Greene
Kristin Reiter
Charlotte Williams
Stephanie Pierson



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Submitted to:
Center for Health Care Strategies
200 American Metro Blvd. Suite
119
Hamilton, NJ 08619

Project Officer: Allison Hamblin

Submitted by:
Mathematica Policy Research
P.O. Box 2393
Princeton, NJ 08543-2393
Telephone: (609) 799-3535
Facsimile: (609) 799-0005
Project Director: Dominick
Esposito

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UNDERSTANDING THE BUSINESS CASE FOR IMPROVING PEDIATRIC ASTHMA CARE: THE PEDIATRIC ASTHMA CARE ENHANCEMENT PROJECT OF MONROE PLAN FOR MEDICAL CARE

The Case Study at a Glance

The Monroe Plan's *Pediatric Asthma Care Enhancement* (PACE) project was a provider-based intervention that sought to improve quality of care for children with asthma by engaging providers via chart reviews and in-person meetings. It aimed to increase providers' awareness of whether the care they give is consistent with accepted asthma care guidelines, such as providing asthma action plans, monitoring asthma symptoms, and prescribing appropriate asthma medications. The intervention is a form of pay for reporting based on the assumption that providers will take advantage of what they learn to improve the consistency with which they practice in accordance with evidence-based guidelines.

The Business Case: Through existing financial arrangements, the Monroe Plan is at 100 percent risk to provide health care services to Medicaid-insured individuals in Rochester, New York and surrounding areas. While it reimburses providers for asthma education and for longer, more intensive visits, its payments provide no direct incentives for physicians to practice in accordance with pediatric asthma care guidelines. Through PACE, the Monroe Plan compensated providers for taking a closer look at the way they deliver asthma care to children and the degree to which this care is consistent with asthma-care guidelines.

The Evaluation: We randomly assigned 25 eligible practices in Rochester and surrounding areas to treatment and control groups, with the former eligible to participate in the PACE intervention. For all eligible children with asthma at both treatment and control practices, we examined health care utilization before and after the start of the intervention, including ED visits, hospital admissions, office visits, and asthma medication use. We also examined whether PACE provided a return on investment (ROI) to Monroe Plan and the participating treatment group practices.

Findings: Providers at treatment group practices began practicing more consistently with asthma care guidelines compared with providers at control group practices. Children assigned to treatment group practices had higher rates of office visits for asthma, greater use of controller medications, and less use of rescue medications than control group members, although impacts on drug use were small and did not appear until the end of the intervention period. There were no impacts on ED visits and hospitalizations, and the overall Monroe Plan ROI was negative. Monroe Plan did achieve a positive ROI among the subgroup of small physician practices. PACE treatment group physician practices achieved a substantial positive ROI due to increased revenue from a higher office visit rate and a low resource cost to conduct chart audits relative to the PACE incentive fee.

Implications for the Business Case in Medicaid: The findings from PACE hold lessons for policymakers and organizations that are considering payment reforms in health care to realign financial incentives in an effort to improve quality. In particular, PACE provides lessons on how to set financial incentives, target an intervention to specific providers or high-risk patient populations, engage providers, monitor intermediate outcomes, and manage expectations about the time needed to achieve a positive ROI.

I. Introduction

The Business Case for Quality, Phase II (BCQII) initiative sought to develop targeted, rigorous, and actionable evidence on the ROI for improving the quality of care for Medicaid beneficiaries and to identify financing misalignments that impede investments in quality, as well as strategies for correcting them from the perspectives of multiple stakeholders. Sponsored by the Center for Health Care Strategies, BCQII was funded by the Robert Wood Johnson Foundation (RWJF) and the Commonwealth Fund. Unlike the initial BCQ initiative, which examined ROI for a variety of medical conditions and Medicaid populations, BCQII grantees focused specifically on interventions that improve care for children with asthma. This focus was selected because it is an important area of concern in Medicaid and one where there is reasonable evidence that interventions can make a difference.

This case study describes Monroe Plan's PACE project, its business case, and findings from its evaluation. The findings are based on analysis of grantee-reported process measures and cost data, ED and inpatient visit data, and outpatient and prescription drug claims data, as well as interviews with program staff and participating physician practices. Monroe Plan is a Medicaid managed care organization in Rochester, New York, with 225,000 members. PACE targets pediatric and family physician practices who each serve at least 20 Monroe Plan-insured children with asthma in the Rochester area and the surrounding Southern Tier and Finger Lakes regions.

II. Monroe Plan's Pediatric Asthma Care Enhancement Project

The PACE intervention was a provider-focused, pay-for-participation program designed to increase primary care providers' awareness of their how well the care they provide aligns with accepted clinical guidelines for asthma care, such as providing asthma action plans, assessing asthma symptoms, and prescribing appropriate asthma medications.¹ The intervention sought to achieve this goal by offering providers a monetary incentive to conduct a chart review for Monroe Plan-insured children with asthma. While providers can bill Monroe Plan for asthma education and charge more for longer, more intensive visits, they do not receive additional compensation for practicing consistently within evidence-based asthma care guidelines. PACE sought to offer providers this incentive to become more aware of how often they practice in accordance with evidence-based asthma care guidelines, ultimately motivating them to deliver higher quality care.

PACE is based on findings from a previous intervention with physician practices, which demonstrated that provider engagement in a chart audit of their own patients is effective at improving the consistency with which providers practice according to evidence-based asthma care guidelines and improving patient-level outcomes (Foels 2006). In addition to improving providers' asthma care practices, Monroe Plan also had the objective of reducing the rates of asthma-related emergency department (ED) and hospital visits for children assigned to participating practices. Although evidence is limited, prior research has shown that increasing some components of quality in the primary care setting can have an impact on rates of ED visits and hospitalizations for asthma. Specifically, asthma education has been shown to decrease the likelihood of having an ED visit for asthma (Coffman et al. 2008), while using an asthma action plan has been shown to decrease the

¹ The PACE intervention was informed by current New York State clinical asthma care guidelines (New York State Consensus Asthma Guideline Expert Panel, 2008).

likelihood of a child's having an ED visit or hospitalization (Gibson et al. 2003; Zemek et al. 2008). Monroe Plan's prior research among children with high asthma-related utilization rates also showed that practicing according to evidence-based asthma care guidelines led to a reduction in ED visits and hospitalizations (Barta 2006; Stankaitis et al. 2006; Hoppin et al. 2007). Figure 1 (at the end of this document) illustrates how the PACE intervention activities are intended to achieve desired short- and long-term outcomes.

Monroe Plan's leadership views asthma as one of its primary focus areas for quality improvement among children, as it is the most prevalent chronic condition affecting children it insures. Moreover, during the year before PACE was initiated about half of the children in the BCQII study population had at least one ED visit for asthma, indicating that Monroe Plan-insured children with asthma are high utilizers of care. Monroe Plan has participated in a number of asthma quality improvement initiatives in the past, including the Improving Asthma Care for Children program funded by RWJF, which sought to improve asthma diagnosis, management, and care coordination for children with asthma, and the original BCQ initiative from 2004 to 2006. In addition, Monroe Plan offers assistance to providers in preparing asthma action plans for children and has implemented an asthma education course for providers, upon completion of which the providers are able to bill for asthma education provided to children with asthma. Monroe Plan also offers home assessments for children with asthma to identify and mediate environmental triggers.

A. Intervention Approach and Details

Practices eligible for PACE were randomized to either a treatment or a control group via a stratified random assignment.² Monroe Plan offered treatment group practices an "incentive fee" of \$5 per eligible Monroe Plan member per month for their participation in PACE, in exchange for conducting chart audits on a percentage of the practice's eligible Monroe Plan members, every six months.³ Treatment group practices that agreed to participate in PACE conducted chart audits seven times throughout the three-year intervention period. To support the evaluation, Monroe Plan audited patient charts for the control group practices every 12 months throughout the three-year intervention period, but these data were not seen or shared with the control group practices.⁴

In addition to conducting chart audits, as part of the PACE intervention, treatment group practices were given feedback on their own chart audit results compared with those of peer practices. After each round of audits, a provider from each treatment group practice (usually the one leading PACE activities within his or her practice) met with Monroe Plan's Chief Medical Officer to discuss the practice's results compared to the average scores among all participating practices. Providers from treatment group practices also participated in twice-yearly "learning collaborative" meetings—hour-long lunchtime meetings during which invited speakers presented on various asthma care topics and included time for practices to interact with each other. In contrast, control

² Mathematica assigned 13 practices to the treatment group and 12 to the control group.

³ Monroe Plan requested that treatment group practices with fewer than 60 eligible Monroe Plan children with asthma complete chart audits for 20 randomly selected children; those with 60-400 eligible Monroe Plan children with asthma were asked to complete chart audits for a randomly selected 28 percent of children; those with more than 400 eligible Monroe Plan children with asthma were asked to complete chart audits for 100 randomly selected children.

⁴ Monroe Plan's external auditor also collected data every 12 months for the two treatment group practices that declined to participate in the PACE intervention, so that these data will be available for all practices.

group practices did not receive summaries of their chart audit results, nor did they participate in the collaborative meetings.

The PACE chart audits were completed using an online survey tool designed by Monroe Plan and implemented by a survey software vendor. The tool includes a variety of questions related to whether children receive appropriate evidence-based pediatric asthma care. Examples of questions include whether the child was provided with an asthma action plan, whether the child had a recent office visit or specialist visit where asthma was addressed, and whether the child was prescribed appropriate rescue and/or controller medications based on the severity of the child's asthma (Table 1). Monroe Plan staff conducted a training session on how to use the tool and how to establish uniform data collection across practices.

Table 1. Example Monroe Plan PACE Chart Audit Measures

-
1. Did the child ever have an environmental assessment for exposure to smoke?
 2. Did the child have a recent office or specialist visit where asthma was addressed (in the past 12 months)?
 3. Has the child had an influenza vaccination in the past 12 months?
 4. Did the child have a comprehensive asthma symptom assessment (assessed for daytime symptoms, activity-related symptoms, nocturnal symptoms, and use of quick-reliever medication)?
 5. Was an asthma action plan created for and reviewed with the child?
 6. Was the child prescribed appropriate rescue and/or controller medications based on the child's asthma severity class? (Appropriateness is calculated by Monroe Plan based on the child's asthma severity class and whether rescue and controller medications were prescribed.)
-

B. Implementation

Overall, PACE was successfully implemented. Monroe Plan achieved a high participation rate among practices (only 2 of 13 declined to participate) and kept most providers well engaged throughout the intervention. Treatment group practices reviewed between 325 and 397 charts in aggregate in each round, while Monroe Plan's independent reviewer conducted chart audits on 178 to 208 children per round for the control group practices.

A few challenges arose during implementation, but Monroe Plan staff worked to overcome each one and minimize its impact. Specifically, when it came time to conduct the chart audits, some providers did not have a good understanding of the definition of an asthma action plan. This became apparent in the first round of data collection, where there was a large discrepancy in the percentage of treatment group children for whom an asthma action plan was reported (36 percent) compared with control group children (12 percent). Through one-on-one discussions and as a group at a collaborative meeting, Monroe Plan learned that some providers had misinterpreted the measure. To correct the issue, Monroe Plan reviewed the definition of *asthma action plan* in detail and reviewed the measure with certain practices individually. This technical assistance and support resulted in a somewhat more balanced percentage of asthma action plans between treatment and control children during the third round of chart audits (20.6 percent in the treatment group compared with 7.1 percent in the control group), though a discrepancy still existed.

Keeping providers engaged throughout the duration of the intervention presented another challenge. Because of competing demands, some practices struggled to complete the chart audits on time. With only a few exceptions, Monroe Plan was successful in obtaining completed chart reviews from all 11 participating treatment practices for all rounds.⁵ The practices that were exceptions highlight another key challenge to an intervention that, like PACE, asks providers to collect information for reimbursement: specifically, that busy, time-constrained providers might not provide requested information in a timely fashion, which would make it harder to monitor their progress.

Monroe Plan also found it challenging to engage practices outside the Rochester area in the Southern Tier and Finger Lakes regions. Because these practices typically did not attend the collaborative meetings, Monroe Plan staff sought to engage them by sending a health plan representative to visit them and encourage attendance. Although persuading time-constrained providers to participate in the twice-yearly collaborative meetings was identified as a potential challenge, actual participation in terms of number of practices was strong throughout the intervention among Rochester area practices. Participation may have been enhanced by Monroe Plan's efforts to bring in experts to discuss topics that were timely and relevant to the practices, the networking opportunity that the meetings presented, and the distribution of the chart audit incentive fee at these meetings.

III. Making the Business Case for Monroe Plan's PACE Intervention

Monroe Plan staff consider PACE and similar initiatives as a way to help its members obtain better quality of care. That is, Monroe Plan would consider the initiative a success if it broke even on its investment while making quality gains; achieving a positive ROI would be ideal, but not essential. Conversely, Monroe Plan would be concerned about continuing an expensive intervention like PACE beyond the BCQII intervention period if it achieved a substantially negative ROI. During interviews, physicians at participating practices generally shared a similar sentiment: the practice would like at least to break even on its investment, but achieving a positive ROI beyond that is not essential. Most practices we interviewed were able to work the chart audits into their staff's existing work schedule, while a few providers conducted the chart audits on their own time, making PACE appear (at least on the surface) to be a financially winning proposition for them.

A. Existing Financial Arrangements and Associated Incentives

PACE has the potential to affect a variety of stakeholders from a financial perspective, including physician practices, hospitals, and New York State Medicaid (Figure 2, at the end of the document). Monroe Plan's existing financial arrangements with physicians, hospitals, and New York State Medicaid, and the resulting incentives (or disincentives) these arrangements create for quality, provide important context for Monroe Plan's PACE intervention.

Monroe Plan's revenues originate from New York State Medicaid, which negotiates per-member-per-month (PMPM) payment rates on a yearly basis with Excellus Blue Cross Blue Shield (Figure 2). In turn, Excellus contracts directly with Monroe Plan at 100 percent risk to provide health care services to Medicaid-insured children. The premiums paid to Excellus are passed on to

⁵ Monroe Plan's independent reviewer collected data from all control group practices in each of the four rounds of control group data collection, with the exception of one practice in the final round. For that practice, we estimated its last round values based on previous experience

Monroe Plan, less Excellus's administrative cost; in turn, Monroe Plan pays providers for services for its enrolled members.

Monroe Plan pays physician practices on a fee-for-service (FFS) basis for primary care services. Some physician practices are part of a larger health system that may include a hospital and other outpatient facilities, which also are paid on an FFS basis for the primary care provided by affiliated practices.⁶ Similarly, Monroe Plan pays hospitals on an FFS basis for inpatient and outpatient services. Inpatient visits are reimbursed on a diagnostic-related-group basis; outpatient visits are reimbursed on a percentage-of-charges basis.

Associated Financial Incentives for PACE Stakeholders

Physician Practices. Although there is an existing financial incentive for physician practices to provide more, and more intensive, office visits, before PACE there was no financial incentive for practices to provide care more consistently with accepted clinical asthma care guidelines. The incentive provided to practices through PACE attempts to align financial incentives for practices to improve quality of care; however, there may be a differential impact of the incentive fee on small, single physician practices who have more of a financial stake in the practice's income, vs. large, staff-model practices. However, Monroe Plan designed the incentive structure to be large enough that practices of all sizes would see it as a significant financial incentive. Over the three-year intervention period, total incentive payments made to each practice ranged from about \$2,300 to \$87,000. From qualitative telephone interviews with five treatment group practices, we learned that most considered the incentive fee a significant motivator for participating in PACE.

New York State Medicaid. In addition to paying Monroe Plan on a capitated basis, New York State Medicaid also has a pay-for-performance program that offers health plans an additional financial incentive to improve quality of care through programs like PACE. This initiative, the Medicaid Incentive Program, rewards Medicaid MCOs with the highest scores on selected quality measures, including pediatric asthma, at the end of each calendar year. Rewards include substantial bonuses (up to 3 percent of premium) and priority for auto-assignment of Medicaid managed care eligibles who do not enroll with a particular Medicaid MCO.⁷ Though Monroe Plan began PACE before New York State Medicaid implemented this aspect of its pay-for-performance program, it adds additional financial incentive for Monroe Plan to improve quality outcomes for children with asthma.

Hospitals. Monroe Plan pays hospitals on an FFS basis for ED and inpatient services. This financial arrangement complements Monroe's efforts to improve quality, as fewer ED visits and hospitalizations among its members will translate to savings for the health plan. Conversely, these efforts would reduce revenue for hospitals that serve Monroe Plan patients. Since hospitals could lose revenue from initiatives like PACE, further financial incentives for hospitals may be needed to

⁶ One health system, Strong Health System, of which control practice Strong Pediatrics is a part, has negotiated a risk-sharing arrangement with Monroe Plan, so its financing arrangement will vary from this model.

⁷ Commonwealth Fund (2005).

motivate hospital leaders to actively pursue quality improvement activities that would result in reduced ED visits and hospitalizations.⁸

B. Opportunities to Improve Financial Alignment

While the PACE intervention sought to improve financial alignment for physician practices to improve quality of care, additional opportunities may exist to further align such incentives for providers. For example, Monroe Plan has already considered allowing practices to bill for the development of asthma action plans, since findings from the chart audits show that most of these providers still do not provide such plans to the majority of children with asthma.

While primary care providers have the ability to affect care that may lead to reduced ED and hospital utilization, hospitals also have the ability to make a difference in terms of preventing return ED use and readmissions. Because hospitals face the potential of reduced revenue as a result of asthma quality improvement activities, further financial realignment may be needed to engage hospitals actively in activities that would reduce inappropriate utilization. Monroe Plan has pursued several strategies to achieve this goal. For example, while it reimburses most hospitals on an FFS basis, it has set up a risk-share arrangement with one hospital system whereby Monroe Plan has a global budget with this system. If the hospital system's actual costs exceed the global budget, the hospital system must share the loss with Monroe Plan. If actual costs are below budget, the hospital system shares the surplus with Monroe Plan. In addition, a portion of the primary care services the hospital system provides for Monroe Plan members are paid on a capitated basis. This type of arrangement (in theory) shifts the financial incentives for the hospital from providing *more* care to providing *more appropriate* care.

C. How Implementation Challenges and Contextual Factors Affect the Business Case

Implementation success depends partly on successfully addressing challenges encountered and partly on contextual factors unique to the organization. In the case of this intervention, one concern identified early on was the need to ensure that individual practices saw the financial reward as real. While many of the PACE treatment group practices are independent, some are part of a larger hospital system and the Monroe Plan team was concerned that the chart audit incentive fee might be retained by the corporate office for these practices, possibly reducing the incentive for these practices to be as engaged in the intervention. To minimize this issue, Monroe Plan distributed the chart audit incentive checks directly to physician practices at the twice-yearly collaborative meetings (which also served as an incentive to attend the meetings). Among the five practices we interviewed that are part of a larger health system, all reported that their practice has kept the chart audit incentive fee for its own use.

Monroe Plan's strong relationship and level of trust with many of the physician practices encouraged provider participation. For some practices, the working relationship with Monroe Plan was a deciding factor that swayed them to participate. Monroe Plan's active engagement of providers before and during the intervention was also key to its ability to implement the PACE intervention

⁸ New York State Medicaid has a pay-for-performance approach to hospital readmissions (defined as a return hospital admission within 30 days of discharge for the initial visit). Hospitals with readmissions exceeding an expected rate are subject to a reduction in their overall FFS payments per admission.

successfully and thus to achieve a positive ROI. Successfully “selling” the initiative to providers by meeting with them and offering them a financial incentive to participate helped Monroe Plan initially led all but one of the physician practices assigned to the treatment group to agree to participate. In addition, physician practices noted that Monroe Plan’s efforts to keep them engaged during the intervention were essential to enabling them to make changes in the way they deliver asthma care. Specifically, holding the twice-yearly collaborative meetings and supplying adequate and timely feedback and results allowed providers to learn about the latest asthma care guidelines and best practices in asthma care, assess how well they were doing, and make changes accordingly.

IV. Evaluation Findings

To evaluate PACE, we conducted several analyses using a variety of data sources, including a quality outcomes analysis and ROI analyses from the perspective of Monroe Plan and participating treatment group practices, using Medicaid claims, eligibility, and cost data. To assess whether PACE was able to improve the consistency with which physicians practice according to evidence-based asthma care guidelines, we reviewed chart audit results and data from a twice-yearly survey of caregivers of children with asthma. We also conducted interviews with PACE treatment group physicians to gauge whether they have made any changes in the way they deliver asthma care as a result of PACE.

Findings from the evaluation indicated that treatment group providers began supplying care more consistently with evidence-based asthma care guidelines, and that children assigned to treatment group practices had higher rates of office visits for asthma, slightly greater use of controller medications, and slightly less use of rescue medications than control group members. However, despite of these promising process measure changes, ultimately there were no impacts on rates of ED visits or hospital use for treatment group vs. control group members during the intervention period.

A. Return on Investment

Overall, ROI was negative for Monroe Plan for the PACE intervention, a result primarily of a lack of impact on ED visits, which ultimately meant a lack of utilization cost savings in these areas in all three years (Table 2).⁹ However, there were several promising signs. In particular, *Monroe Plan achieved a positive ROI within the “small practice” subgroup*, defined as those with fewer than 100 eligible Monroe patients with asthma.¹⁰ However, these savings were due not to a reduction in ED visits, but to declines in other types of inpatient and outpatient utilization (lab and x-ray). Nevertheless, this

⁹ A description of methodology for the ROI analyses can be found in the BCQII Final Report, Chapter 2 and Appendix B. For additional detail on operating costs and PMPM payments and utilization by type of service, see Appendix A, Tables 1 and 2.

¹⁰This analysis allocated investment and operating costs between small, medium, and large practices proportionally by number of members allocated to each practice size at baseline; as a result, we allocated 18 percent of investment and operating costs to small practices, 38 percent to medium, and 44 percent to large. Since a portion of investment and operating costs are fixed, this allocation likely underestimates the expected cost to Monroe Plan of implementing the PACE intervention on only one practice size subgroup. However, even if we had increased the amount of investment and operating costs attributed to small practices by threefold, Monroe Plan would have still achieved a positive ROI on the small practices subgroup.

positive ROI was consistent and was found in all three years of the intervention period for small practices. Monroe Plan also achieved utilization cost savings in the third year of the intervention among the subgroup of children eligible from the beginning of the intervention period. Again, however, these utilization cost-savings resulted not from reduced ED visits, but from reductions among treatment group patients in other types of utilization. Had Monroe paid the physician practices differently (specifically, reduced the chart audit incentive fee by half) it would also have achieved a positive ROI for in the third year for this subgroup.

Table 2. Monroe Plan Return on Investment

	Members Served In:			
	All Practices	Small Practices	Mid-sized Practices	Large Practices
Discounted Cost Savings/Loss from the Intervention	\$(399,548)	\$286,939	(\$177,466)	(\$202,957)
Discounted Investment/Operating Costs	\$385,547	\$66,872	\$135,847	\$183,295
Cumulative Benefit-Cost Ratio ^a	-1.04	4.29	-1.31	-1.11
Net Present Value^b	(\$785,095)	\$220,067	(\$313,313)	(\$386,251)

Source: Monroe Plan for Medical Care financial, claims, and enrollment data.

Note: For more detail on operating costs and PMPM payments and utilization by type of service, see Appendix A, Tables 1 and 2.

Small practices had less than 100 children with asthma assigned to them, mid-sized practices had more than 100 but less than 200, and large practices had more than 200.

^aCumulative benefit-cost ratio is the ratio of the discounted cost savings (or loss) from the intervention to discounted investment and operating costs.

^bNet present value is the discounted cost savings (or loss) from the intervention, less discounted investment/ operating costs.

The PACE secondary stakeholder ROI analysis shows that *PACE treatment group physician practices achieved a substantial, positive ROI* for the entire intervention period (Table 3). This was due to an increase in office visits for treatment group patients compared with control group patients over the course of the intervention period (resulting in increased revenue for these practices), coupled with the relatively low resource costs to practices associated with completing the chart audits relative to the PACE chart audit incentive fee.

Table 3. Monroe Plan Secondary Stakeholder Analysis: ROI for Treatment Group Physician Practices

Per Practice Averages, by Practice Size	Large	Medium	Small
Total Incentive Payments per Practice	\$59,409	\$39,345	\$19,819
Net Incentive Payments per Practice	\$48,840	\$21,033	\$4,328
Net Incentive Payments plus Utilization Gains per Practice	\$105,120	\$15,978	\$10,194

Source: Data from Monroe Plan on amount of chart audit incentive payments, estimated time spent by Monroe Plan's reviewer to conduct a chart audit, provider salary data, and office visit utilization from Monroe Plan medical claims data.

Note: Net incentive payments reflect total incentive payments from Monroe Plan to the practice less the estimated cost of performing the chart audits. Utilization gains reflect incremental increases in office visits in the treatment group practices multiplied by the average payment per service.

Small practices had less than 100 children with asthma assigned to them, mid-sized practices had more than 100 but less than 200, and large practices had more than 200.

B. The Study Population

To evaluate the PACE intervention, we identified children with asthma who were enrolled in the Monroe Plan Medicaid managed care plan between January 1, 2008, and June 30, 2011, and met all research sample inclusion criteria. Of the 7,731 children in the research sample, 3,721 (48.1 percent) were associated with one of the 13 practices assigned to the PACE treatment group, and 4,010 (51.9 percent) were associated with one of the 12 practices assigned to the PACE control group.¹¹ Detailed description of methods used to identify the research sample, the outcome measures, and the empirical methods we used in this study are included in the BCQII Final Report, Appendix A.

The study population included a diverse group of children. About three quarters were 12 years old or younger, and about two-thirds were of minority race/ethnicity, including black, Hispanic, Native American, and Asian/Pacific Islander; however, a significantly higher fraction of children associated with control practices were black compared with the treatment group, and a lower fraction were Hispanic (Appendix A, Tables 3 and 4). All other baseline differences in characteristics between the children in treatment and control practices were not statistically significant.

During the baseline period, children in the study population were relatively high utilizers of ED services for asthma and other conditions. In the 12 months before the intervention period, more than half of all children had an ED visit for any reason, and nearly one quarter had two or more ED visits (Appendix A, Tables 5 and 6). Very few children had a hospital admission in the baseline period, though nearly all had an office visit, with an average of 6.5 visits per child and with most of these visits for reasons other than asthma (Appendix A, Table 7). Fewer than 40 percent of all

¹¹ PACE practices designated as small, medium, and large in terms of number of eligible Monroe Plan members associated with the practice accounted for 17, 42, and 41 percent of the sample, respectively. Sixty-four percent of the children were patients of a PACE Rochester-area practice, while the rest were patients at a Finger Lakes or Southern Tier practice.

children had any outpatient visits, while just 6 percent had any outpatient use for asthma (Appendix A, Table 7).¹²

Treatment-control differences in baseline utilization measures were not statistically significant, with one exception. During the baseline period, children in the treatment group had slightly higher asthma controller medication use for some, but not all, controller medication utilization measures (Appendix A, Tables 8 and 9). This may be due to chance (one statistically significant difference among many insignificant findings) or may reflect real or permanent differences in these two groups. When estimating intervention period impacts, we used multivariate regression adjustment to control for these differences.

According to data collected by Monroe Plan in its semiannual parent and caregiver survey, the majority of children with asthma had their condition fairly well-controlled.¹³ Specifically, throughout the intervention period, about two-thirds of respondents reported that their child's asthma interfered with his or her life "a little of the time or none of the time" while about three-fourths reported that the child's education suffered as a result of asthma symptoms at school "a little of the time or none of the time." In addition, about two-thirds reported that the child stayed indoors because of wheezing or coughing "a little of the time or none of the time." Additionally, survey respondents perceived that they have a high degree of asthma knowledge and self-efficacy; about 85 percent reported that they know what to do for their child during an asthma attack "all or most of the time," about three quarters believe that they can recognize the early warning signs of an asthma attack "all or most of the time," and more than three quarters report that they are able to recognize the things that make their child's asthma worse "all or most of the time."¹⁴

C. Impacts of the PACE Intervention on Processes of Care

Findings from PACE Process Measure Data

To analyze changes in the Monroe Plan process measure data (the chart audit data treatment group practices collected, and that was collected from control group practices by an external auditor) over time for treatment versus control group practices, we used a difference-in-differences analysis. This analysis showed *statistically significant, positive trends for the treatment group compared to the control group* over the intervention period for several process measures, including the *percentage of children who received an asthma action plan, who were prescribed appropriate medications, were assessed for use of rescue medications, had a recent office visit where asthma was addressed, and have an environmental assessment for smoke*

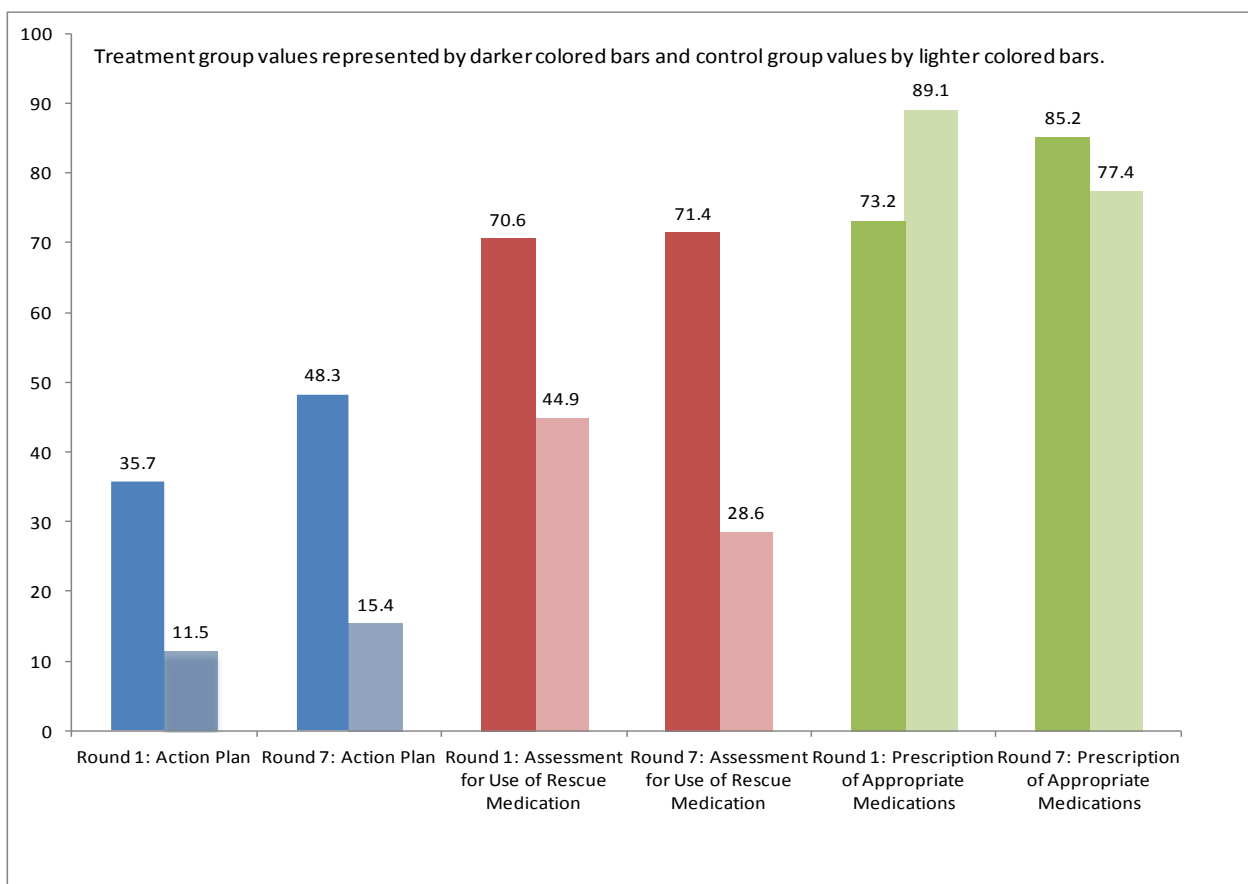
¹² Unlike office visits, which tend to be office visits to a provider, outpatient use includes mainly visits for lab and x-ray services which we do not expect to be as prevalent among children with asthma.

¹³ The ITG-QOL survey was fielded seven times throughout the PACE intervention period. The survey sample of 750 included 250 parents and caregivers of Monroe Plan children with asthma associated with PACE treatment practices, 250 associated with control practices, and 250 associated with non-design practices. The response rate was 21% - 31% per round.

¹⁴ Differences-in-differences analyses comparing baseline to end-of-intervention period differences between treatment and control groups showed that there was little sign of treatment group change on the survey measures relative to control group throughout the intervention period. However, the relatively small number of respondents also made it less likely that statistically significant treatment-control differences would be detectable.

(Figure 3). Specifically, the percentage of children at treatment group practices who received an asthma action plan increased from 21 to 48 percent between the third and seventh rounds, while the percentage at control group practices increased from 7 to 15 percent. The percentage prescribed a rescue medications was relatively stable among children assigned to the treatment group (about 71 percent), but the percentage of control group children prescribed rescue medications fell from 45 to 29 percent. However, the percentage of children prescribed rescue medications was much smaller in the control group throughout the next three rounds of data collection, which suggests that the first-round number might not have been a true representation of the real value. Finally, the percentage of children at treatment group practices who received appropriate medications increased from 73 to 85 percent between rounds 1 and 7, while the percentage at control group practices dropped from 89 to 77 percent.

Figure 3. Monroe Plan Chart Audit Findings



Source: PACE treatment and control group chart audits conducted between November 2008 and February 2011.

Note: For more detailed data on these measures for all rounds of data collection, see Appendix A, Tables 10 through 16.

Findings from PACE Provider Interviews

To supplement the outcomes analysis and identify whether PACE was achieving some of the intermediate steps in the logic model (e.g., improving physicians’ consistency of practicing according to evidence-based asthma care guidelines), we also conducted interviews with five participating practices. *Practices reported making considerable changes in the way they deliver asthma care as a direct result of PACE* (Table 5). All five practices began *providing asthma action plans on a more systematic basis* for children with asthma, and *shared the PACE chart audit results with all providers in the practice* as a result of

PACE. Some practices made other changes, such as *implementing spirometry* (a method of testing children in-office for the presence of asthma), *monitoring medication use*, or *bringing children in annually for flu vaccines*. These findings suggest that paying providers to participate in an intervention like PACE may be effective in motivating them to increase the consistency with which they practice according to the guidelines.

Table 5. Practices' Changes in Asthma Care as a Result of PACE

Asthma Action Plans	All five practices realized that they should be providing proper asthma action plans on a more systematic basis for children with asthma, and began to do so as a result. One practice also created a survey that investigates what prevents providers from making asthma action plans.
Sharing Results	All five practices shared the PACE chart audit results with all the practices' providers and also noted that the data were useful and helpful; one practice said it would be even more helpful to have the feedback data (and therefore the chart reviews) four times a year instead of twice, so that providers could better gauge progress on the measures.
Implementing Spirometry	Two practices purchased and implemented spirometry equipment for assessing children's lung function as a result of PACE; one practice earmarked funds from the PACE incentive fee specifically for the purchase of this equipment.
Monitoring Medication Use	Two practices began keeping tabs on the appropriateness of patient medication use , based on frequency of rescue medication refills.
Partnering with a Hospital to Reduce Utilization	One practice, part of a health system, used the PACE data as a foundation to work with its hospital to reduce ED visits and hospitalizations for children with asthma by providing better follow-up for admitted children with asthma.
Influenza Vaccine	One practice began bringing in children with asthma annually for an influenza vaccination , while another began asking children more systematically if they had had an influenza vaccine recently ^a
EMR Modifications	One practice created a template that included all PACE questions in its electronic medical record (EMR) , which appears as a prompt for physicians to ask children during visits. Another practice noted that it would have been very helpful to them to have something like this available to them; they instead tried to remember to incorporate the PACE-specific questions into patient visits.
Educational Materials	One practice added a folder of asthma educational materials to each examination room for providers to give out to children and appointed a staff member to ensure that the folder was stocked.

Source: Mathematica interviews with physician practices, January to November 2011.

^aInfluenza vaccinations are recommended yearly for individuals over 6 months old with asthma. Among children with asthma, influenza can greatly exacerbate asthma symptoms and increases the likelihood that the child will visit the ED or become hospitalized (CDC 2011).

D. Impacts of the PACE Intervention on Health Care Utilization

Emergency Department and Hospital Use. For the entire two-and a half-year intervention period and each year of the intervention, differences in ED and hospital use (any use or asthma-related use) between the treatment and control groups were small and not statistically significant.¹⁵

¹⁵ In the second year of the intervention, the proportion of children with an ED visit (for any reason or for asthma) was higher for the treatment group compared to the control group (Appendix A, Table 10).

During each year of the intervention period, approximately 13-18 percent of the study population had an ED visit for asthma, while less than 1.5 percent had a hospitalization for asthma (Appendix A, Tables 17 and 18). During the entire intervention period, about 10 percent of children in the study population had two or more ED or hospital visits for asthma, indicating that they are relatively high risk (Appendix A, Table 19).¹⁶

Office and Outpatient Visits. During the intervention period, treatment group children visited their physician for asthma more frequently than children assigned to the control group, and required fewer asthma-related lab or x-ray services in the outpatient setting (Table 6). Specifically, in the first and third years of the intervention, a higher percentage of treatment group children had at least one office visit for asthma compared with the control group (Table 6).¹⁷ While only a small percentage of children (about 11 percent) had any outpatient use for asthma during the intervention period (the vast majority of these visits were for lab and x-ray services), there was consistently less use on a year-by-year basis in the treatment group compared to the control group (Table 6). These findings suggest that, in accordance with the asthma care guidelines, treatment group physicians are bringing children in more often for office follow-up visits to address their asthma symptoms compared with control group physicians. The finding of reduced lab and x-ray utilization among treatment group practices is more challenging to interpret. Physicians typically order outpatient lab and x-ray testing if in-office testing for asthma is inconclusive, which suggests that, compared with control group physicians, treatment group physicians may be doing a better job of diagnosing children's asthma in-office (for example, through spirometry, which several treatment group physicians reported implementing as a result of PACE)—without the need for additional lab or x-ray testing.

Medication Use. By the end of the intervention period, asthma medication use began to look more favorable for the treatment group, but the effects are relatively small and should be interpreted cautiously (Table 7). For example, by the third year of PACE, children in the treatment group were more likely than control group children to have four or more fills of controller medications (19.7 percent versus 16.2 percent, $p < 0.01$) (Table 7). In addition, treatment group children had fewer fills of rescue medications by the third intervention year (5.5 percent versus 9.0 percent, $p < 0.01$), and the average number of rescue fills per child was also smaller in the treatment group (0.48 versus 0.61, $p=0.02$). Prior studies have shown that a higher ratio of controller medications to all asthma medications has been tied to better quality of care and better outcomes for children with asthma (Broder et al. 2010; Schatz et al. 2006). However, while these treatment-control differences seem to signal promise in this area, the treatment-control differences in the ratio of days of medication available (DMA) for controller medications to DMA for all medications were not statistically significant during the intervention period, or in any of the three individual years of the study (Appendix A, Tables 20 through 23).

¹⁶ We also estimated impacts for each intervention year separately for eight outcomes for four subgroups, and only five were statistically significant, but they were all for the large practice subgroup. On balance, we believe these differences are due more to chance than to program impacts, because they are not all in the direction we might expect, and because we have no other evidence to suggest that PACE had an effect on asthma care at these practices.

¹⁷ It is possible that additional, relatively healthy children with asthma had office visits where asthma was addressed, but these visits were not coded as “for asthma” because the child’s asthma was not the reason for the visit. During the intervention period, 97 percent of children in the study population had at least one office visit for any reason.

Table 6. Percentage of Children with Office and Outpatient Visits for Asthma

	Treatment	Control	Difference	p-value
Number of Children	3,721	4,010		
Outpatient Visits for Asthma				
Entire intervention period	9.7	13.4	-3.7	0.096
Year 1	4.7	6.7	-2.1	0.093
Year 2	3.9	6.0	-2.1	0.016
Year 3	5.3	7.7	-2.4	0.014
Office Visits for Asthma				
Entire intervention period	68.0	65.1	2.8	0.247
Year 1	49.0	44.7	4.4	0.048
Year 2	41.5	38.2	3.3	0.256
Year 3	43.4	34.7	8.6	< 0.01

Source: Monroe Plan for Medical Care claims and enrollment data.

Notes: Includes all children with asthma who are enrolled in the Monroe Plan, are at least 2 years old and younger than 19, have a diagnosis of asthma (493.xx) on any medical claim during the year before or in the intervention period (before January 2010), and are affiliated with a treatment or control group practice. Year 1 corresponds to each child's first year of program eligibility.

Because children in the study population are enrolled for different amounts of time, we weight results according to number of days enrolled during the intervention period. We normalize weights so that they sum to the total number of sample members. We adjusted standard errors for clustering at the practice level.

Table 7. Medication Use Among the Monroe Plan Study Population

	Number of Children		Percentage with Measure		Difference	p-Value
	Treatment	Control	Treatment	Control		
Utilization of Controller Medications						
Percentage with Four or More Fills						
Entire Intervention Period	3,721	4,010	35.0	35.7	0.7	0.854
Year 1	3,721	4,010	21.7	21.9	-0.0	0.630
Year 2	2,733	2,983	21.6	21.2	0.3	0.210
Year 3	1,612	1,773	19.7	16.2	3.5	<0.01
Utilization of Rescue Medications						
Percentage with Four or More Fills						
Entire Intervention Period	3,721	4,010	29.7	30.3	-0.6	<0.01
Year 1	3,721	4,010	14.6	15.5	-0.9	<0.01
Year 2	2,733	2,983	14.3	15.8	-1.5	0.479
Year 3	1,612	1,773	5.5	9.0	-3.5	<0.01

Sources: Monroe Plan for Medical Care prescription drug claims and enrollment data.

Notes: Includes all children with asthma who are enrolled in the Monroe Plan, are at least 2 years old and younger than 19, have a diagnosis of asthma (493.xx) on any medical claim during the year before or in the intervention period (before January 2010), and are affiliated with a treatment or control group practice. Year 1 corresponds to each child's first year of program eligibility.

Because children in the study population are enrolled for different amounts of time, we weight results according to number of days enrolled during the intervention period. We normalize weights so that they sum to the total number of sample members. We adjusted standard errors for clustering at the practice level.

Controller medications include inhaled corticosteroids, leukotriene inhibitors, long-acting bronchodilators, and mast-cell stabilizers. Rescue medications include short-acting beta agonists and noninhaled corticosteroids.

D. Limitations

The study design for the Monroe Plan PACE evaluation employed a stratified random assignment approach, allowing us to attribute changes in the treatment group to the intervention rather than to underlying trends over time. However, since Monroe plan did not obtain 100 percent participation among treatment group practices, and patients associated with these practices were included in the treatment group for the analysis, the effects of the PACE intervention may be slightly underestimated. Further, this study relies on the accuracy of the claims data (in particular, hospitals and practices correctly coding diagnoses and procedures), and on Monroe Plan correctly identifying patients to practices for the purposes of this study.

V. Implications for the Business Case in Medicaid

Lessons from the PACE intervention may be of interest more broadly to both policymakers and other organizations seeking to improve quality in a way that provides a financial return. With state and federal government focusing on payment reform for Medicare and Medicaid in a way that rewards quality, through such avenues as accountable care organizations (ACOs), shared savings programs, and pay-for-performance programs, evidence from programs like PACE may help inform the development of these initiatives. In particular, PACE offers several lessons on implementing quality improvement initiatives for Medicaid children with asthma and achieving a positive ROI on these initiatives.

Overall, an intervention modeled after PACE is likely to improve the consistency with which providers practice in accordance with evidence-based asthma guidelines and improve patients' quality of care within the office setting, but an impact on rates of ED visits in the short term (three years) and ROI is less certain. PACE evaluation findings suggest that an intervention like PACE has the best chance of yielding a positive ROI when incentives are set appropriately (large enough to entice practices to participate, but not so large that ROI is extremely difficult to achieve), the practices selected are relatively small (only a few physicians per practice), and the intervention operates for a long time (at least three years). Having a strong relationship with the physician practices (as Monroe Plan did) and monitoring implementation success and performance over time are also keys to successfully implementing an intervention like PACE.

Lessons for Achieving a Positive ROI

Though PACE was effective at improving the consistency with which physicians practice according to evidence-based guidelines, this improvement did not yield a reduction in ED visits or hospitalizations, or a positive ROI. This raises questions about the effectiveness of the asthma care guidelines for improving outcomes among Medicaid-insured children with asthma. A solely provider-based intervention that focuses on improving physicians' practices in accordance with evidence-based guidelines may not be enough to affect the health care utilization patterns of a population with complex environmental, social, and economic issues. Instead, a multifaceted intervention approach may be needed that addresses the barriers to appropriate health care utilization that this population faces.

Though BCQII did not require that Monroe Plan (or other grantees) alter payment arrangements or offer financial incentives as part of their intervention, results from the PACE intervention suggest that setting appropriate financial incentives may be a key part of achieving an ROI. The multi-stakeholder analysis illustrated that because Monroe paid practices per eligible

patient with asthma (not based on number of charts audited, which was capped for larger practices), large practices received a substantially higher incentive fee relative to small practices, both in absolute terms and per chart audit completed. However, though it paid them less, Monroe Plan achieved a positive ROI among the small practices subgroup. This suggests that Monroe Plan could have set the bar higher for large practices—for example, tie part of their payment to a reduction in ED visits—to make the (relatively) large incentive fee paid to these practices worth the investment. With a larger number of physicians and more temporary staff such as medical residents, and a salaried/staff model, an intervention like PACE may be more diluted in the large practice setting. Conversely, small practices may have been better able to assimilate the results of the chart audits into their practice, and the overall affect of the “physician champion” for the intervention within these practices will be stronger. Smaller practices may also be more motivated by the financial incentive since these practices often have only a small number of physicians who tend to have a significant financial stake in the practice.

Targeting an intervention among providers who are more likely to be receptive to and affected by it is more likely to yield a positive ROI. Though PACE did not provide Monroe Plan with a positive ROI overall, it did provide an ROI among the “small practices subgroup,” which suggests that if Monroe Plan continued PACE among only this subgroup of providers, it might be able to achieve a positive ROI overall.

Further, due to the significant financial investments Monroe Plan made to implement PACE (including the chart audit incentive payments), this meant that the intervention would need to achieve moderate reductions in utilization (at least \$386,000, discounted, over three years) in order to achieve a positive ROI. Organizations may find it helpful, before implementing an intervention, to project its direct costs, to estimate what type of reduction in ED visits they would need to achieve to “break even,” and to gauge realistically whether this type of reduction is achievable within the intervention’s time frame.

Achieving savings on an intervention like PACE requires patience for savings to accrue and a recognition that they are not guaranteed. For a provider-based intervention focused on Medicaid children with asthma (like PACE), these findings suggest that organizations need, at a minimum, to have a willingness to wait several years (at least three) for any savings to accrue. While Monroe Plan began to see signs of utilization savings in the intervention’s third year, it was only among the subgroup of children most likely to have the longest amount of time to be affected by the intervention: those eligible since the baseline period. Even then, these utilization savings were due to a reduction not in ED visits, but in other types of care (such as lab and x-ray services for asthma and inpatient use for asthma), so it is difficult to interpret whether these changes are a result of PACE or a result of other factors.

Lessons for Implementing Quality Improvement Programs

Monitoring of process measures or intermediate outcomes is particularly important for organizations implementing quality improvement programs, like PACE. Monitoring of process measures allowed Monroe Plan to spot the intervention’s problems early and correct them as needed. By examining the chart audit data after every round of data collection, Monroe Plan was able to determine that some treatment group practices were misinterpreting the asthma action plan measure. By reviewing what an asthma action plan is—an important part of the asthma care guidelines—providers became both educated and able to report more accurately whether or not they were providing such a plan (and presumably, recognize their own success or deficiency in this area).

For provider-based interventions like PACE, establishing (1) a strong relationship with providers; and (2) at a minimum, provider buy-in for the intervention's design is critical to successful implementation. In addition, keeping providers engaged throughout the intervention might require more work than originally planned, but it is needed to sustain the results. The implementation of Monroe Plan's PACE intervention would not have been as successful had it not achieved a high participation rate among treatment group providers. As we found from our interviews with providers, this high rate was enhanced by the monetary incentive, but also in large part through the strong relationships Monroe Plan had built with providers. Further, Monroe Plan worked hard to keep providers engaged all during the intervention through regular communication with practices, twice-yearly collaborative meetings, and in-person meetings with physicians to review chart audit results, and by sending a representative to the practices outside the Rochester area to encourage participation in the collaborative meetings.

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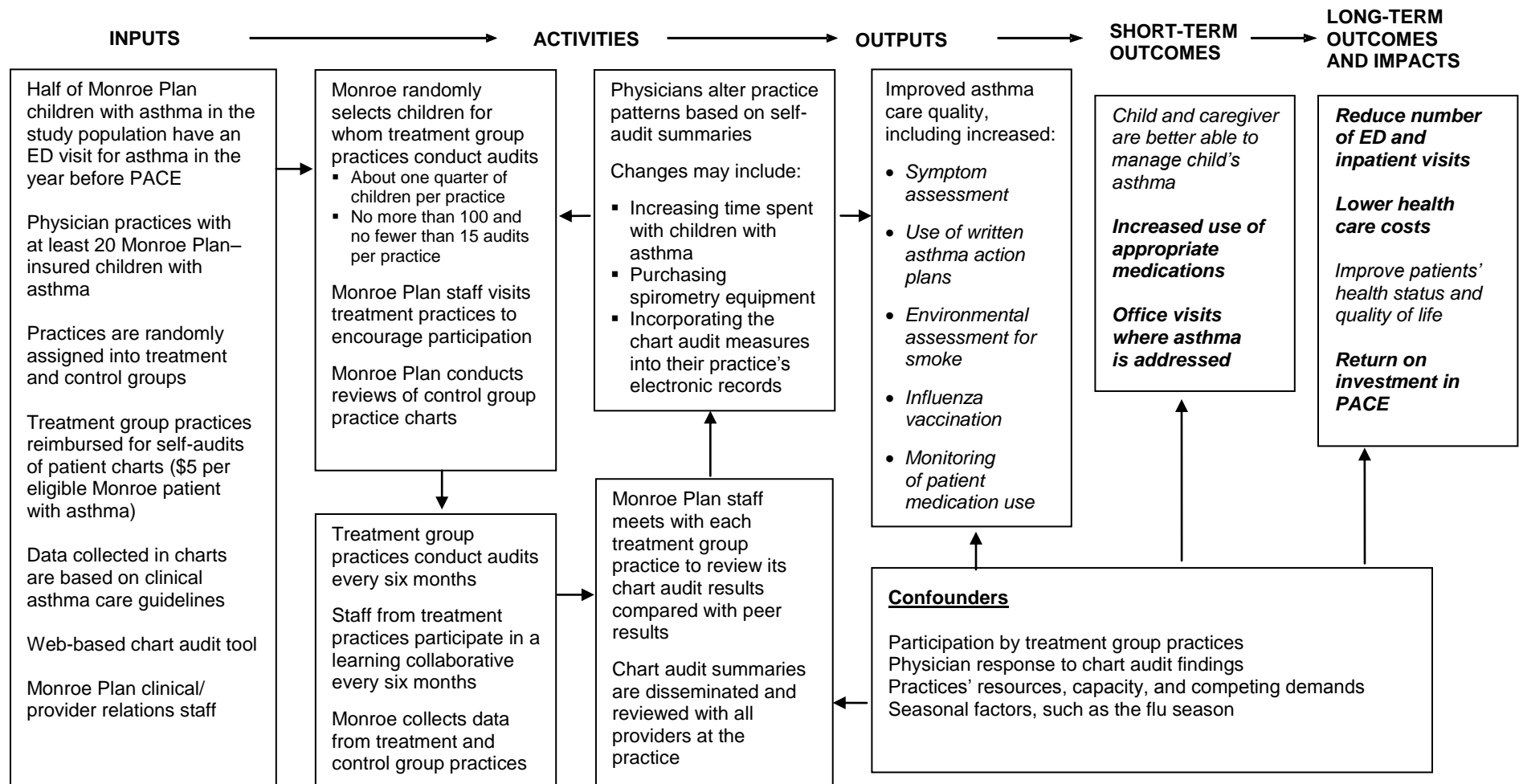
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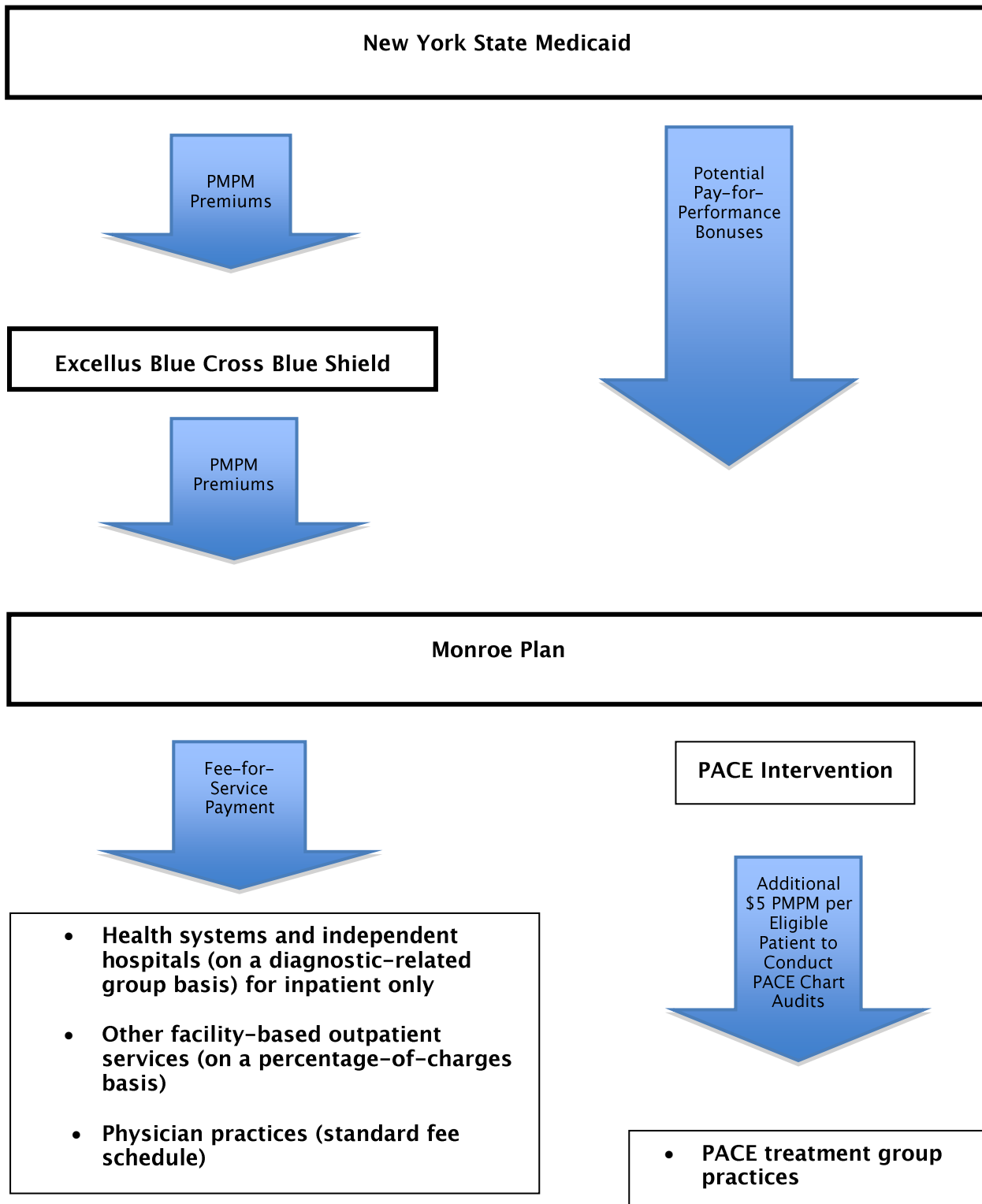
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Figure 1: Logic Model for the Pediatric Asthma Care Enhancement (PACE) Program



Note: Italic text indicates reported process measures or survey data. Bold italic text indicates outcome measures to be collected with claims data. ED = emergency department.

Figure 2. Financing Arrangements: Monroe Plan PACE Intervention



APPENDIX A

PACE INTERVENTION OUTCOMES AND RETURN ON INVESTMENT TABLES

Table 1. Monroe Plan (member month analysis): Average PMPM Payments by Service, Baseline, Year 1, Year 2, and Year 3

Service	Baseline ^a		Year 1 ^b		Year 2 ^b		Year 3 ^b	
	Treatment	Control	Treatment	Control	Treatment	Control	Treatment	Control
All Services	\$192.51	\$209.58	\$219.37	\$233.27	\$230.85	\$239.52	\$218.59	\$234.02
Inpatient	\$13.38	\$20.51	\$20.40	\$27.37	\$22.98	\$25.00	\$16.69	\$24.75
Capitation	\$6.29	\$9.19	\$4.78	\$8.85	\$4.90	\$8.90	\$4.60	\$8.88
Outpatient	\$22.93	\$29.65	\$28.09	\$34.28	\$28.94	\$39.41	\$32.48	\$37.24
Office	\$44.02	\$39.55	\$47.45	\$43.05	\$46.85	\$42.53	\$46.29	\$43.62
ED	\$26.23	\$29.71	\$38.78	\$34.25	\$36.96	\$30.50	\$40.66	\$32.71
Ambulance	\$2.05	\$3.12	\$2.31	\$2.85	\$2.39	\$2.27	\$2.65	\$2.42
Home	\$0.41	\$0.59	\$0.34	\$0.60	\$0.41	\$0.74	\$0.52	\$0.62
Pharmacy	\$73.77	\$74.07	\$73.90	\$78.32	\$83.02	\$85.65	\$70.56	\$78.24
Other	\$3.43	\$3.20	\$3.33	\$3.71	\$4.40	\$4.54	\$4.14	\$5.54

Source: Monroe Plan for Medical Care medical and prescription drug claims and enrollment data.

Note: Includes all children with asthma who are enrolled in the Monroe Plan, are at least 2 years old and younger than 19, have a diagnosis of asthma (493.xx) on any medical claim during the year before or in the intervention period (before January 2010), and are affiliated with a treatment or control group practice.

^aThe baseline period is from January 1, 2008, to December 31, 2008.

^bYear 1 is from January 1, 2009, to December 31, 2009; year 2 is from January 1, 2010, to December 31, 2010; and year 3 (a truncated year) is from January 1, 2011, to June 30, 2011. Treatment and control are determined by practice site. Members who switch practices are included only until the switch occurs, and then are removed from the analysis. Newly diagnosed members with asthma are included in the study, with claims from prior years included for all months during which the member is older than 2 or younger than 19.

Table 2. Monroe Plan: Pre-implementation (investment), Year 1, Year 2, and Year 3 Operating Costs

Cost Type	Pre-implementation Costs ^a	Year 1 Costs ^b	Year 2 Costs ^c	Year 3 Costs ^d
Personnel	\$37,743	\$36,521	\$41,681	\$22,050
Contractual Services	\$0	\$7,220	\$0	\$0
Office/Travel/Training	\$394	\$403	\$365	\$178
Equipment (Software)	\$8,954	\$954	\$954	\$0
Care Management Fees	\$0	\$53,060	\$86,955	\$96,945
Indirect	\$3,272	\$3,166	\$3,547	\$2,090
Total Intervention Costs	\$50,363	\$101,324	\$133,501	\$121,263
Evaluation-Related Costs	\$10,801	\$20,757	\$14,563	\$4,914
Total Intervention and Evaluation-Related Costs	\$61,164	\$122,081	\$148,064	\$126,177

Source: Monroe Plan for Medical Care financial data.

Note: Includes all children with asthma who are enrolled in the Monroe Plan, are at least 2 years old and younger than 19, have a diagnosis of asthma (493.xx) on any medical claim during the year before or in the intervention period (before January 2010), and are affiliated with a treatment or control group practice.

^aThe pre-implementation (investment) costs include investment costs prior to January 1, 2009.

^bYear 1 costs include operating costs for the intervention period January 1, 2009, to December 31, 2009.

^cYear 2 costs include operating costs for the intervention period January 1, 2010, to December 31, 2010.

^dYear 3 costs include operating costs for the intervention period January 1, 2011, to June 30, 2011

Table 3. Characteristics of Monroe Plan Study Population (percentages, unless otherwise specified)

	Treatment	Control	Difference	p-value
Number of Beneficiaries	3,721	4,010		
Age on Date of Eligibility				
2 to 5 years	36.2	37.7	-1.5	0.615
More than 5 to 12 years	38.7	38.9	-0.2	
More than 12 to 15 years	13.5	12.1	1.4	
More than 15 to 19 years	11.7	11.3	0.3	
Male	55.2	56.0	-0.8	0.522
Race/Ethnicity				
White	25.4	24.3	1.1	<0.01
Black	21.5	32.9	-11.4	
Hispanic	23.7	12.8	10.9	
Native American	0.1	0.1	0.0	
Asian/Pacific Islander	0.8	1.2	-0.4	
Other	1.1	1.5	0.4	
Unknown/missing	27.4	27.2		
Practice Size				
Small (<100 children with asthma)	20.4	14.3	6.1	0.883
Medium (100-300)	40.3	44.0	-3.7	
Large (>300)	39.3	41.7	-2.4	
Prior Evidence of Asthma ^a				
One visit	31.6	38.1	-6.5	0.261
2 to 5 office visits	25.4	25	0.4	
6 to 9 office visits, 1 to 4 ED visits, or 1 hospitalization	39	33.8	5.2	
More than 9 office visits, 1 hospitalization, or 4 ED visits	4.1	3.1	1	
Common Comorbid Conditions ^b				
Acute respiratory infection	33.2	28.9	4.3	0.196
Ear infection (otitis media)	33.8	32.8	0.9	0.845
Attention deficit disorder	33.2	28.9	4.3	0.196
Pneumonia	12.4	9.6	2.8	0.132
Allergies	33.2	28.9	4.3	0.196
Obesity	11	9.5	1.5	0.609
Child's First Date of Eligibility				
Jan 1, 2009	45.3	45.2	0.1	0.967
Jan 2, 2009 - Dec 31, 2009	27.5	27.9	-0.4	
Jan 1, 2010 - Dec 31, 2010	26.1	25.7	0.5	
Jan 1, 2011	1.6	1.4	0.1	
Mean Number of Months Enrolled	19.9	20.1	-0.1	0.849
Percentage Enrolled for (months):				
Fewer than 12	24.2	23.6	0.6	0.125
12 to fewer than 24	31.7	31.4	0.3	
24 to 30	44.1	45.1	-0.9	
Southern Tier Practices	33.5	39.2	-5.7	0.821

Source: Monroe Plan for Medical Care medical claims and enrollment data.

Note: Includes all children with asthma who are enrolled in the Monroe Plan, are at least 2 years old and younger than 19, have a diagnosis of asthma (493.xx) on any medical claim during the year before or in the intervention period (before January 2010), and are affiliated with a treatment or control group practice. Because children in the study population are enrolled for different amounts of time, we weight results according to number of days enrolled during the intervention period. We normalize weights so that they sum to the total number of sample members. We adjusted standard errors for clustering at the practice level.

^aWe classified an ED, office visit, or hospital admission as being for asthma if any diagnosis was for asthma.

^bWe identified common comorbid conditions from ED and hospital claims with any diagnosis of acute respiratory infection (460.xx to 466.xx and 786.xx), ear infection (382.xx), attention deficit disorder (314.xx), pneumonia (486.xx), allergies (477.xx), and obesity (278.xx).

ED = emergency department.

Table 4. Race and Ethnicity of Monroe Plan Study Population by Practice Size (percentages, unless otherwise specified)

	Treatment	Control	Difference	p-value
Small Practices				
Number of Beneficiaries	758	574		
Race/Ethnicity				
White	27	30.3	-3.3	0.397
Black	14	4	10	
Hispanic	19.5	7.5	12	
Native American	-	-	-	
Asian/Pacific Islander	0.7	0.2	0.5	
Other	0.5	0.5	0	
Unknown/missing	38.3	57.5	-19.2	
Medium-Sized Practices				
Number of Beneficiaries	1,499	1,763		
Race/Ethnicity				
White	30.8	35.5	-4.7	<0.01
Black	23	25.3	-2.3	
Hispanic	15.5	9.8	5.7	
Native American	0.3	0.2	0.1	
Asian/Pacific Islander	0.7	1.8	-1.1	
Other	1.9	2.6	-0.7	
Unknown/missing	27.8	24.8	3	
Large Practices				
Number of Beneficiaries	1,464	1,673		
Race/Ethnicity				
White	18.9	10.4	8.5	<0.01
Black	23.9	50.9	-27	
Hispanic	34.3	17.7	16.6	
Native American	0.1	0.1	0	
Asian/Pacific Islander	1.1	1.1	0	
Other	0.5	0.7	-0.2	
Unknown/missing	21.2	19.2	2	

Source: Monroe Plan for Medical Care medical claims and enrollment data.

Notes: Includes all children with asthma who are enrolled in the Monroe Plan, are at least 2 years old and younger than 19, have a diagnosis of asthma (493.xx) on any medical claim during the year before or in the intervention period (before January 2010), and are affiliated with a treatment or control group practice.

Because children in the study population are enrolled for different amounts of time, we weight results according to number of days enrolled during the intervention period. We normalize weights so that they sum to the total number of sample members.

p-values are taken from t-tests (for dichotomous and continuous variables) and chi-square tests (for categorical variables).

Table 5. Emergency Department (ED) Visits and Hospital Admissions Among Monroe Plan Study Population in Baseline Period (percentages, unless otherwise specified)

	Treatment	Control	Difference	p-value
Number of Beneficiaries	3,721	4,010		
ED Visits or Hospital Admissions for Any Reason				
Any ED Visit	51.9	51	0.9	0.745
Mean Annualized Number of ED Visits	1.118	1.082	0.036	0.680
Any Hospital Admission	0.8	0.9	-0.2	0.440
Mean Annualized Number of Hospital Admissions	0.008	0.01	-0.002	0.339
ED Visits or Hospital Admissions for Asthma				
Any ED Visit	18.6	16.3	2.3	0.499
Mean Annualized Number of ED Visits	0.264	0.232	0.032	0.520
Any Hospital Admission	0.4	0.3	0.1	0.620
Mean Annualized Number of Hospital Admissions	0.004	0.003	0.001	0.595

Source: Monroe Plan for Medical Care medical claims and enrollment data.

Notes: Includes all children with asthma who are enrolled in the Monroe Plan, are at least 2 years old and younger than 19, have a diagnosis of asthma (493.xx) on any medical claim during the year before or in the intervention period (before January 2010), and are affiliated with a treatment or control group practice.

Because children in the study population are enrolled for different amounts of time, we weight results according to number of days enrolled during the intervention period. We normalize weights so that they sum to the total number of sample members. We adjusted standard errors for clustering at the practice level.

p-values are taken from t-tests.

Table 6. Distribution of Emergency Department (ED) Visits and Hospital Admissions in the Monroe Plan Study Population in the Baseline Period (percentages)

	Treatment	Control	Difference	<i>p</i> -value
Number of Beneficiaries	3,721	4,010		
ED Visits or Hospital Admissions for Any Reason				
ED Visits				
0	48.1	49	-0.9	0.936
1	28.0	27.5	0.5	
2 or more	23.9	23.5	0.4	
Hospital Admissions				
0	99.2	99.1	0.2	0.455
1	0.7	0.8	-0.1	
2 or more	0	0.1	-0.1	
ED Visits or Hospital Admissions for Asthma				
ED Visits				
0	81.4	83.7	-2.3	0.694
1	14.1	12.2	2.0	
2 or more	4.5	4.2	0.3	
Hospital Admissions				
0	99.6	99.7	-0.1	0.620
1	0.4	0.3	0.1	
2 or more	0.0	0.0	0.0	

Source: Monroe Plan for Medical Care medical claims and enrollment data.

Notes: Includes all children with asthma who are enrolled in the Monroe Plan, are at least 2 years old and younger than 19, have a diagnosis of asthma (493.xx) on any medical claim during the year before or in the intervention period (before January 2010), and are affiliated with a treatment or control group practice.

Because children in the study population are enrolled for different amounts of time, we weight results according to number of days enrolled during the intervention period. We normalize weights so that they sum to the total number of sample members. We adjusted standard errors for clustering at the practice level.

We define an ED visit or hospital admission as being for asthma if any diagnosis code on the claim was for asthma.

Table 7. Outpatient and Office Visits for Asthma Among Monroe Plan Study Population in Baseline Period (percentages, unless otherwise specified)

	Treatment	Control	Difference	<i>p</i> -value
Number of Beneficiaries	3,721	4,010		
Outpatient Visits for Any Reason				
Any Outpatient Visit	37.1	40.1	-3.0	0.695
Mean Annualized Number of Outpatient Visits	1.1	1.3	-0.2	0.249
Outpatient Visits for Asthma				
Any Outpatient Visit	5.6	6.8	-1.2	0.462
Mean Annualized Number of Outpatient Visits	0.1	0.1	0.0	0.252
Office Visits for Any Reason				
Any Office Visit	98.1	98.2	-0.1	0.757
Mean Annualized Number of Office Visits	6.6	6.5	0.2	0.829
Office Visits for Asthma				
Any Office Visit	62.8	60.7	2.2	0.509
Mean Annualized Number of Office Visits	1.3	1.1	0.2	0.099

Source: Monroe Plan for Medical Care medical claims and enrollment data.

Notes: Includes all children with asthma who are enrolled in the Monroe Plan, are at least 2 years old and younger than 19, have a diagnosis of asthma (493.xx) on any medical claim during the year before or in the intervention period (before January 2010), and are affiliated with a treatment or control group practice.

Because children in the study population are enrolled for different amounts of time, we weight results according to number of days enrolled during the intervention period. We normalize weights so that they sum to the total number of sample members. We adjusted standard errors for clustering at the practice level.

We define an outpatient or office visit as being for asthma if any diagnosis code on the claim was for asthma.

Table 8. Asthma Medication Utilization in the Monroe Plan Study Population in Baseline Period: Number of Fills and Appropriate Medications

	Treatment	Control	Difference	<i>p</i> -value
Number of Beneficiaries	3,721	4,010		
Utilization of Controller Medications				
Average Number of Fills	2.1	1.8	0.2	0.240
Percentage with:				
No fills	53.4	55.5	-2.1	0.026
More than 0 up to 3 fills	28.0	28.5	-0.5	
More than 3 and up to 6 fills	7.9	7.7	0.3	
More than 6 and up to 9 fills	4.2	2.7	1.5	
More than 9 fills	6.5	5.7	0.9	
Utilization of Rescue Medications				
Average Number of Fills	1.4	1.7	-0.3	0.102
Percentage with:				
No fills	29.4	27.7	1.7	0.131
More than 0 up to 3 fills	58.3	56.6	1.7	
More than 3 and up to 6 fills	8.6	10.8	-2.2	
More than 6 and up to 9 fills	2.5	2.3	0.2	
More than 9 fills	1.2	2.5	-1.3	
Appropriate Medications				
All	43.56	46.25	-2.69	0.571
Persistent Asthma Subgroup (n=930)	54.91	59.27	-4.36	0.235
Nonpersistent Asthma Subgroup (n=4,326)	40.35	42.99	-2.64	0.622

Source: Monroe Plan for Medical Care prescription drug claims and enrollment data.

Notes: Includes all children with asthma who are enrolled in the Monroe Plan, are at least 2 years old and younger than 19, have a diagnosis of asthma (493.xx) on any medical claim during the year before or in the intervention period (before January 2010), and are affiliated with a treatment or control group practice.

Because children in the study population are enrolled for different amounts of time, we weight results according to number of days enrolled during the intervention period. We normalize weights so that they sum to the total number of sample members. We adjusted standard errors for clustering at the practice level.

We measure use of controller and rescue medications in the 12 months before a treatment or control group member's index date. Controller medications include inhaled corticosteroids, leukotriene inhibitors, long-acting bronchodilators, and mast-cell stabilizers. Rescue medications include short-acting beta agonists and noninhaled corticosteroids.

Appropriate medications outcome is a dummy variable that equals one if (1) the child had at least 6 office visits, 1 ED visit, or 1 hospitalization for asthma in the baseline period ("persistent asthma") AND filled at least 1 controller and at least 1 rescue medication in the respective year or if (2) the child had at least 1 office visit for asthma in the baseline period ("nonpersistent asthma") AND filled at least 1 rescue medication in the respective year.

Table 9. Asthma Medication Utilization in the Monroe Plan Study Population in Baseline Period: Days of Medication Available and Percentage of Days Covered

	Treatment	Control	Difference	p-value
Number of Beneficiaries	3,721	4,010		
Utilization of Controller Medications				
Mean Days of Medication Available (DMA) ^a	61.7	54.7	7	0.240
Percentage with:				
No DMA	53.4	55.5	-2.1	0.026
More than 0 and up to 90	28	28.5	-0.5	
More than 90 and up to 180	7.9	7.7	0.3	
More than 180 and up to 270	4.2	2.7	1.5	
More than 270	6.5	5.7	0.9	
Percentage of Days Covered (PDC) in 2008 ^b				
Average PDC	26.3	23.4	2.9	0.173
Percentage with PDC ≥80%	22.6	20.7	1.9	0.376
Percentage with PDC ≥90%	21	18.9	2.1	0.280
Utilization of Rescue Medications				
Mean Days of Medication Available (DMA) ^a	41.0	50.9	-9.9	0.102
Percentage with:				
No DMA	29.4	27.7	1.7	0.130
More than 0 and up to 90	58.3	56.6	1.7	
More than 90 and up to 180	8.6	10.8	-2.2	
More than 180 and up to 270	2.5	2.3	0.2	
More than 270	1.2	2.5	-1.3	
Ratio of Controller Medications to Total Asthma Medications				
Mean of Ratio of Controller Medications DMA to Controller plus Rescue Medications DMA	0.38	0.34	0.04	0.239

Source: Monroe Plan for Medical Care prescription drug claims and enrollment data.

Note: Includes all children with asthma who are enrolled in the Monroe Plan, are at least 2 years old and younger than 19, have a diagnosis of asthma (493.xx) on any medical claim during the year before or in the intervention period (before January 2010), and are affiliated with a treatment or control group practice.

Because children in the study population are enrolled for different amounts of time, we weight results according to number of days enrolled during the intervention period. We normalize weights so that they sum to the total number of sample members. We adjusted standard errors for clustering at the practice level.

We measure use of controller and rescue medications in the 12 months before a treatment or control group member's index date. For a complete list of medications examined, see Table 8 of Appendix A.

^aDMA is the sum of all the day's supply fields on Monroe pharmacy claims data for each sample member.

^b Percentage of days covered is calculated by dividing adjusted DMA by the number days enrolled and multiplying by 100. The adjusted DMA subtracts any medication available that extends beyond December 31, 2008, from actual DMA.

Table 10. Monroe Plan Chart Audit Findings

	Total Number of Children with Asthma with Data Available (N)		Percentage with Measure			
	Treatment	Control	Treatment	Control	Difference	p-value
Child Had Recent Visit Where Asthma Was Addressed						
Round 1	292	165	83.6	82.4	1.1	0.755
Round 3	353	170	88.7	89.4	-0.7	0.800
Round 5	360	177	90.0	92.7	-2.7	0.316
Round 7	375	186	94.7	83.4	11.4	<0.01
Rd 1 vs Rd 7	--	--	11.1	1.0	10.1	0.016
Child Provided an Asthma Action Plan						
Round 1	292	165	35.7	11.5	24.2	<0.01
Round 3	353	170	20.6	7.1	13.6	<0.01
Round 5	360	177	40.6	11.3	29.3	<0.01
Round 7	375	186	48.3	15.4	32.9	<0.01
Rd 3 vs Rd 7	--	--	27.7	8.3	19.4	<0.01
Children Provided with an Environmental Assessment for Smoke						
Round 1	292	165	67.5	69.7	-2.2	0.623
Round 3	353	170	72.4	73.5	-1.1	0.789
Round 5	360	177	81.1	68.4	12.8	<0.01
Round 7	375	186	84.5	75.4	9.1	0.010
Rd 1 vs Rd 7	--	--	17.0	5.7	11.3	0.040
Children Assessed for Used of Rescue Medications						
Round 1	292	165	70.6	44.9	25.7	<0.01
Round 3	353	170	66.6	24.7	41.9	<0.01
Round 5	360	177	73.6	32.8	40.8	<0.01
Round 7	375	186	71.4	28.6	42.7	<0.01
Rd 1 vs Rd 7	--	--	0.8	-16.3	17.1	<0.01
Child Prescribed Appropriate Medications						
Round 1	142	55	73.2	89.1	-15.9	0.017
Round 3	188	36	83.5	97.2	-13.7	0.032
Round 5	236	55	80.5	94.6	-14.0	0.013
Round 7	252	74	85.2	77.4	7.8	0.112
Rd 1 vs Rd 7	--	--	12.0	-11.7	23.8	<0.01

Source: PACE treatment and control group chart audits.

Note: Round 1 chart audits took place from November, 2008 to February, 2009; round 3 chart audits took place from November, 2009 to February, 2010; round 5 chart audits took place from November, 2010 to February, 2011; and round 7 chart audits took place from November, 2011 to February, 2012.

Table 11. Number of Charts Reviewed by Practice for Treatment Group Children with a History of Asthma

Practice	Treatment, Round 1	Treatment, Round 3	Treatment, Round 5	Treatment, Round 7
Rochester General Pediatrics Associates	74	102	98	80
Wayne Medical Group	35	45	44	57
Finger Lakes Medical Associates	30	32	30	28
Anthony Jordan Health Center	28	26	20	29
University Health Service	16	18	32	42
Highland Family Medicine	15	19	22	21
John Maerz	15	19	16	15
Eunice Nayo	14	13	11	9
Clinton Family Health	13	20	17	0
Endwell	13	14	17	16
Panorama Pediatric Group	13	17	17	20
William Bayer	13	18	16	20
Stony Brook Pediatrics	13	10	20	18
Total Number of Children	292	353	360	375

Source: PACE treatment and control group chart audits.

Note: Round 1 chart audits took place from November, 2008 to February, 2009; round 3 chart audits took place from November, 2009 to February, 2010; round 5 chart audits took place from November, 2010 to February, 2011; and round 7 chart audits took place from November, 2011 to February, 2012. Rounds 2, 4, and 6 are not shown because treatment group data, but not control group data, was collected for these rounds.

Clinton Family Health was not able to complete its chart audits for round 7. Since UHS and Stony Brook Pediatrics declined to participate in PACE, Monroe Plan's external reviewer completed chart audits for these practices.

Table 12. Number of Charts Reviewed by Practice for Control Group Children with a History of Asthma

Practice	Control, Round 1	Control, Round 3	Control, Round 5	Control, Round 7
Strong Pediatrics	40	25	35	40
GHS Pediatrics	30	29	22	0
Unity West Main Peds	13	14	13	12
Lourdes	12	23	31	31
UMA	11	13	13	15
Westside Health Center	10	11	10	7
Abdul Qadir	10	10	10	10
Azmat Saeed	10	7	10	9
Southern Tier Pediatrics	9	10	8	10
Oak Orchard CHC	8	8	10	9
David Breen	7	10	10	10
Unity Associates in Family Practice	5	10	5	6
Total Number of Children	165	170	177	186

Source: PACE treatment and control group chart audits.

Note: Round 1 chart audits took place from November, 2008 to February, 2009; round 3 chart audits took place from November, 2009 to February, 2010; round 5 chart audits took place from November, 2010 to February, 2011; and round 7 chart audits took place from November, 2011 to February, 2012. Rounds 2, 4, and 6 are not shown because treatment group data, but not control group data, was collected for these rounds.

Monroe Plan's external reviewer was not able to conduct chart audits for GHS Pediatrics for round 7.

Table 13. Monroe Plan Chart Audit Findings: Specialty Care and Influenza Vaccination

	Number		Percentage		Difference	p-value
	Treatment	Control	Treatment	Control		
Child Sees a Specialist for Asthma						
Round 1	292	165	17.1	17.0	0.2	0.967
Round 3	353	170	10.9	9.4	1.5	0.596
Round 5	360	177	16.4	18.6	-2.3	0.515
Round 7 ^a	375	186	18.4	17.0	1.4	0.680
Child Has Had an Influenza Vaccination						
Round 1	292	165	43.5	40.6	2.9	0.549
Round 3	353	170	57.8	51.8	6.0	0.194
Round 5	360	177	57.2	52.0	5.2	0.251
Round 7 ^a	375	186	50.7	45.3	5.4	0.230

Source: PACE treatment and control group chart audits.

Note: Round 1 chart audits took place from November, 2008 to February, 2009; round 3 chart audits took place from November, 2009 to February, 2010; round 5 chart audits took place from November, 2010 to February, 2011; and round 7 chart audits took place from November, 2011 to February, 2012. Rounds 2, 4, and 6 are not shown because treatment group data, but not control group data, was collected for these rounds.

^aRound 7 values are imputed for treatment group practice Clinton Family Health and control group practice GHS Pediatrics based on the trend in values for all prior rounds of chart audits, as Clinton Family Health did not complete chart audits for round 7, and Monroe Plan's external reviewer was not able to conduct audits at GHS pediatrics for this round.

Table 14. Monroe Plan Chart Audit Findings: Prevalence of Asthma-Related Symptoms Among Those Assessed

	Number		Percentage		Difference	p-value
	Treatment	Control	Treatment	Control		
More than 2 Days per Week the Child Had Daytime Symptoms						
Round 1	292	165	21.3	40.0	-18.7	<0.01
Round 3	353	170	28.4	14.3	14.2	0.079
Round 5	360	177	27.6	31.6	-4.0	0.545
Round 7 ^a	375	186	39.6	18.7	20.9	<0.01
More than 2 Days per Week the Child Had Nocturnal Symptoms						
Round 1	292	165	20.0	40.6	-20.6	<0.01
Round 3	353	170	19.2	18.4	0.8	0.912
Round 5	360	177	17.5	18.5	-1.2	0.852
Round 7 ^a	375	186	25.1	14.2	10.9	0.042
More than 2 Days per Week the Child Had Activity-Related Symptoms						
Round 1	292	165	15.6	23.9	-8.3	0.182
Round 3	353	170	22.5	15.4	7.1	0.412
Round 5	360	177	23.2	27.1	-3.9	0.569
Round 7 ^a	375	186	27.6	25.3	2.3	0.712

Source: PACE treatment and control group chart audits.

Note: Round 1 chart audits took place from November, 2008 to February, 2009; round 3 chart audits took place from November, 2009 to February, 2010; round 5 chart audits took place from November, 2010 to February, 2011; and round 7 chart audits took place from November, 2011 to February, 2012. Rounds 2, 4, and 6 are not shown because treatment group data, but not control group data, was collected for these rounds.

^aRound 7 values are imputed for treatment group practice Clinton Family Health and control group practice GHS Pediatrics based on the trend in values for all prior rounds of chart audits, as Clinton Family Health did not complete chart audits for round 7, and Monroe Plan's external reviewer was not able to conduct audits at GHS pediatrics for this round.

Table 15. Monroe Plan Chart Audit Findings: Patients with Smoke Exposure

	Number		Percentage		Difference	<i>p</i> -value
	Treatment	Control	Treatment	Control		
Child Had Exposure to Smoke						
Round 1	197	115	27.1	36.4	-9.3	0.096
Round 3	252	125	36.3	39.0	-2.7	0.613
Round 5	292	121	36.8	37.8	-1.0	0.854
Round 7 ^a	309	117	30.5	30.5	0.0	0.992

Source: PACE treatment and control group chart audits.

Note: Round 1 chart audits took place from November, 2008 to February, 2009; round 3 chart audits took place from November, 2009 to February, 2010; round 5 chart audits took place from November, 2010 to February, 2011; and round 7 chart audits took place from November, 2011 to February, 2012. Rounds 2, 4, and 6 are not shown because treatment group data, but not control group data, was collected for these rounds.

^aRound 7 values are imputed for treatment group practice Clinton Family Health and control group practice GHS Pediatrics based on the trend in values for all prior rounds of chart audits, as Clinton Family Health did not complete chart audits for round 7, and Monroe Plan's external reviewer was not able to conduct audits at GHS pediatrics for this round.

Table 16. Monroe Plan Chart Audit Findings: Medications Prescribed

	Number		Percentage		Difference	p-value
	Treatment	Control	Treatment	Control		
Child Was Prescribed Rescue Medications						
Round 1	292	165	68.5	86.7	-18.2	<0.01
Round 3	353	170	84.1	98.2	-14.1	<0.01
Round 5	360	177	80.6	96.1	-15.5	<0.01
Round 7 ^a	375	186	86.3	92.1	-5.8	0.046
Child Was Prescribed Controller Medications						
Round 1	292	165	43.8	64.8	-21.0	<0.01
Round 3	353	170	56.9	64.1	-7.2	0.118
Round 5	360	177	60.3	62.1	-1.9	0.677
Round 7 ^a	375	186	59.4	60.5	-1.1	0.796
Child Was Prescribed No Medications						
Round 1	292	165	26.0	9.1	16.9	<0.01
Round 3	353	170	13.0	0.0	13.0	<0.01
Round 5	360	177	13.9	2.3	11.6	<0.01
Round 7 ^a	375	186	11.2	5.6	5.6	<0.01

Source: PACE treatment and control group chart audits.

Note: Round 1 chart audits took place from November, 2008 to February, 2009; round 3 chart audits took place from November, 2009 to February, 2010; round 5 chart audits took place from November, 2010 to February, 2011; and round 7 chart audits took place from November, 2011 to February, 2012. Rounds 2, 4, and 6 are not shown because treatment group data, but not control group data, was collected for these rounds.

^aRound 7 values are imputed for treatment group practice Clinton Family Health and control group practice GHS Pediatrics based on the trend in values for all prior rounds of chart audits, as Clinton Family Health did not complete chart audits for round 7, and Monroe Plan's external reviewer was not able to conduct audits at GHS pediatrics for this round.

Table 17. Emergency Department (ED) Visits Among Monroe Plan Study Population Members During the Intervention Period

	Treatment	Control	Difference	<i>p</i> -value
Number of Beneficiaries	3,721	4,010		
ED Visits for Any Reason				
Any ED Visit				
Entire intervention period	72.33	69.46	2.87	0.137
Year 1	50.8	49.78	1.01	0.620
Year 2	45.68	41.16	4.51	0.032
Year 3	44.27	42.71	1.56	0.585
ED Visits for Asthma				
Any ED Visit				
Entire intervention period	32.97	29.82	3.14	0.344
Year 1	18.07	16.9	1.16	0.581
Year 2	15.56	12.63	2.92	0.054
Year 3	13.06	13.2	-0.14	0.957

Source: Monroe Plan for Medical Care medical claims and enrollment data.

Note: Includes all children with asthma who are enrolled in the Monroe Plan, are at least 2 years old and younger than 19, have a diagnosis of asthma (493.xx) on any medical claim during the year before or in the intervention period (before January 2010), and are affiliated with a treatment or control group practice. Years 1, 2, and 3 correspond to each child's first, second, and third year of program eligibility, respectively.

Because children in the study population are enrolled for different amounts of time, we weight results according to number of days enrolled during the intervention period. We normalize weights so that they sum to the total number of sample members. We adjusted standard errors for clustering at the practice level.

All estimates are regression-adjusted. For complete details, see Appendix A of the BCQII Final Report.

Table 18. Hospital Admissions Among Monroe Plan Study Population in Intervention Period

	Treatment	Control	Difference	<i>p</i> -value
Number of Beneficiaries	3,721	4,010		
Hospital Admissions for Any Reason				
Any Hospital Admission				
Entire intervention period	2.12	2.12	0.0	0.995
Year 1	0.77	0.88	-0.11	0.600
Year 2	1.14	0.94	0.2	0.420
Year 3	1.29	1.22	0.08	0.892
Hospital Admissions for Asthma				
Any Hospital Admission				
Entire intervention period	1.22	1.37	-0.14	0.646
Year 1	0.57	0.56	0.01	0.967
Year 2	0.62	0.6	0.03	0.895
Year 3	1.06	1.49	-0.45	0.583

Source: Monroe Plan for Medical Care medical claims and enrollment data.

Notes: Includes all children with asthma who are enrolled in the Monroe Plan, are at least 2 years old and younger than 19, have a diagnosis of asthma (493.xx) on any medical claim during the year before or in the intervention period (before January 2010), and are affiliated with a treatment or control group practice. Years 1, 2, and 3 correspond to each child's first, second, and third year of program eligibility, respectively.

Because children in the study population are enrolled for different amounts of time, we weight results according to number of days enrolled during the intervention period. We normalize weights so that they sum to the total number of sample members. We adjusted standard errors for clustering at the practice level.

All estimates are regression-adjusted. For complete details, see Appendix A of the BCQII Final Report.

Table 19. Distribution of Emergency Department (ED) and Hospital Admissions in the Monroe Plan Study Population in Entire Intervention Period

	Treatment	Control	Difference	<i>p</i> -value
Number of Beneficiaries	3,721	4,010		
ED Visits or Hospital Admissions for Any Reason				
ED Visits				
0	27.62	30.51	-2.88	0.180
1	27.95	26.95	1.0	
2 or more	44.42	42.54	1.89	
ED Visits or Hospital Admissions for Asthma				
ED Visits				
0	67.06	70.15	-3.09	0.560
1	22.59	20.25	2.34	
2 or more	10.35	9.60	0.75	

Source: Monroe Plan for Medical Care medical claims and enrollment data.

Notes: Includes all children with asthma who are enrolled in the Monroe Plan, are at least 2 years old and younger than 19, have a diagnosis of asthma (493.xx) on any medical claim during the year before or in the intervention period (before January 2010), and are affiliated with a treatment or control group practice. Years 1, 2, and 3 correspond to each child's first, second, and third year of program eligibility, respectively.

Because children in the study population are enrolled for different amounts of time, we weight results according to number of days enrolled during the intervention period. We normalize weights so that they sum to the total number of sample members. We adjusted standard errors for clustering at the practice level.

We also conducted an analysis for each year of the intervention period, but did not find any statistically significant differences (results not shown).

All estimates are regression-adjusted. For complete details, see Appendix A of the BCQII Final Report.

Table 20. Asthma Medication Utilization in the Monroe Plan Study Population in Entire Intervention Period

	Treatment	Control	Difference	p-value
Number of Beneficiaries	3,721	4,010		
Utilization of Controller Medications				
Average Number of Fills	4.01	4.00	0.01	0.978
Percentage with:				
No fills	37.92	37.04	0.88	0.854
1 to 3 fills	27.09	27.27	-0.18	
4 to 6 fills	11.26	11.97	-0.71	
7 to 9 fills	6.82	6.48	0.34	
10 or more fills	16.91	17.24	-0.33	
Percentage of Days Covered (PDC) ^a				
Average PDC	22.72	22.12	0.6	0.628
Percentage with PDC ≥80%	16.72	15.42	1.3	0.077
Percentage with PDC ≥90% ^b	13.97	13.07	0.9	0.226
Utilization of Rescue Medications				
Average Number of Fills	4.33	4.68	-0.35	0.670
Percentage with:				
No fills	19.42	18.51	0.92	<0.01
1 to 3 fills	50.87	51.24	-0.35	
4 to 6 fills	16.3	15.29	1.01	
7 to 9 fills	7.88	7.04	0.84	
10 or more fills	5.52	7.92	-2.42	
Appropriate Medications				
All	60.63	61.72	-1.09	0.799
Persistent Asthma Subgroup (n=1,483)	59.7	64.18	-4.48	0.321
Nonpersistent Asthma Subgroup (n=6,248)	60.87	61.16	-0.29	0.949
Ratio of Controller Medications to Total Asthma Medications				
Mean of Ratio of Controller Medications DMA to Controller Plus Rescue Medications DMA	0.43	0.43	0.01	0.768

Source: Monroe Plan for Medical Care prescription drug claims and enrollment data.

Notes: Includes all children with asthma who are enrolled in the Monroe Plan, are at least 2 years old and younger than 19, have a diagnosis of asthma (493.xx) on any medical claim during the year before or in the intervention period (before January 2010), and are affiliated with a treatment or control group practice. Years 1, 2, and 3 correspond to each child's first, second, and third year of program eligibility, respectively.

Because children in the study population are enrolled for different amounts of time, we weight results according to number of days enrolled during the intervention period. We normalize weights so that they sum to the total number of sample members. We adjusted standard errors for clustering at the practice level.

All estimates are regression-adjusted. For complete details, see Appendix A of the BCQII Final Report.

For a list of medications examined, see Table 8 of Appendix A.

^aPercentage of days covered is calculated by dividing adjusted DMA by the number days enrolled and multiplying by 100. The adjusted DMA subtracts any medication available that extends beyond December 31, 2008, from actual DMA.

DMA = days of medication available.

Table 21. Asthma Medication Utilization in the Monroe Plan Study Population in First, Second, and Third Year of Intervention Period: Number of Fills and Appropriate Medication Use

	Treatment	Control	Difference	<i>p</i> -value
Number of Beneficiaries	3,721	4,010		
Utilization of Controller Medications				
Average Number of Fills				
Year 1	2.14	2.16	-0.03	0.836
Year 2	1.92	1.9	0.02	0.883
Year 3	1.04	1.02	0.02	0.834
Utilization of Rescue Medications				
Average Number of Fills				
Year 1	1.73	1.82	-0.09	0.540
Year 2	1.32	1.42	-0.11	0.314
Year 3	0.48	0.61	-0.13	0.018
Appropriate Medications – Year 1				
All	42.02	41.84	0.18	0.958
Persistent Asthma Subgroup (n=1,483)	45.03	47.74	-2.71	0.484
Nonpersistent Asthma Subgroup (n=6,248)	41.26	40.51	0.75	0.838
Appropriate Medications – Year 2				
All	39.92	41.05	-1.13	0.812
Persistent Asthma Subgroup (n=1,152)	45.43	47.92	-2.49	0.655
Nonpersistent Asthma Subgroup (n=4,564)	38.35	39.35	-1	0.829
Appropriate Medications – Year 3				
All	29.15	36.43	-7.28	0.163
Persistent Asthma Subgroup (n=791)	38.77	42.34	-3.57	0.557
Nonpersistent Asthma Subgroup (n=2,594)	25.53	34.56	-9.03	0.087

Source: Monroe Plan for Medical Care prescription drug claims and enrollment data.

Notes: Includes all children with asthma who are enrolled in the Monroe Plan, are at least 2 years old and younger than 19, have a diagnosis of asthma (493.xx) on any medical claim during the year before or in the intervention period (before January 2010), and are affiliated with a treatment or control group practice. Years 1, 2, and 3 correspond to each child's first, second, and third year of program eligibility, respectively.

Because children in the study population are enrolled for different amounts of time, we weight results according to number of days enrolled during the intervention period. We normalize weights so that they sum to the total number of sample members. We adjusted standard errors for clustering at the practice level.

All estimates are regression-adjusted. For complete details, see Appendix A of the BCQII Final Report.

For a list of medications examined, see Table 8 of Appendix A.

Table 22. Asthma Medication Utilization in the Monroe Plan Study Population in First, Second, and Third Years of Intervention Period: Days of Medication Available

	Treatment	Control	Difference	p-value
Number of Beneficiaries	3,721	4,010		
Utilization of Controller Medications				
Mean Days of Medication Available ^{a,b}				
Year 1	65.03	63.98	1.05	0.792
Year 2	58.12	56.21	1.91	0.706
Year 3	31.66	30.37	1.29	0.730
Utilization of Rescue Medications				
Mean Days of Medication Available ^{a,b}				
Year 1	40.38	42.97	-2.59	0.287
Year 2	34.93	38.12	-3.19	0.211
Year 3	13.5	17.41	-3.91	0.018

Source: Monroe Plan for Medical Care prescription drug claims and enrollment data.

Notes: Includes all children with asthma who are enrolled in the Monroe Plan, are at least 2 years old and younger than 19, have a diagnosis of asthma (493.xx) on any medical claim during the year before or in the intervention period (before January 2010), and are affiliated with a treatment or control group practice. Years 1, 2, and 3 correspond to each child's first, second, and third year of program eligibility, respectively.

Because children in the study population are enrolled for different amounts of time, we weight results according to number of days enrolled during the intervention period. We normalize weights so that they sum to the total number of sample members. We adjusted standard errors for clustering at the practice level. All estimates are regression-adjusted.

For complete details, see Appendix A of the BCQII Final Report.

For a list of medications examined, see Table 8 of Appendix A.

^a"Days of medication available" is the sum of all the days' supply fields on Monroe pharmacy claims data for each sample member.

Table 23. Asthma Medication Utilization in the Monroe Plan Study Population in First, Second, and Third Years of Intervention Period: Days of Medication Available, Percentage of Days Covered, and Ratio of Controller Medications to Total Asthma Medications

	Treatment	Control	Difference	p-value
Number of Beneficiaries	3,721	4,010		
Utilization of Controller Medications				
Year 1				
Percentage with				
No DMA ^a	54.55	53.93	0.62	0.630
More than 0 and up to 90	23.80	24.13	-0.33	
More than 90	21.65	21.94	-0.29	
Percentage of Days Covered (PDC) in 2008 ^c				
Percentage with PDC ≥80%	15.00	14.33	0.66	0.395
Year 2				
Percentage with				
No DMA ^a	56.36	55.35	1.01	0.210
More than 0 and up to 90	22.1	23.43	-1.33	
More than 90	21.55	21.22	0.32	
PDC in 2008 ^b				
Percentage with PDC ≥80%	17.08	15.46	1.62	0.023
Year 3				
Percentage with:				
No DMA ^a	52.36	52.22	0.14	<0.01
More than 0 and up to 90	27.94	31.61	-3.67	
More than 90	19.71	16.16	3.53	
PDC in 2008 ^b				
Percentage with PDC ≥80%	28.1	27.39	0.71	0.711
Utilization of Rescue Medications				
Year 1				
Percentage with:				
No DMA ^a	36.81	35.96	0.86	0.010
More than 0 and up to 90	48.58	48.51	0.08	
More than 90	14.6	15.53	-0.94	
Year 2				
Percentage with				
No DMA ^a	41.45	40.28	1.18	0.481
More than 0 and up to 90	44.21	43.88	0.33	
More than 90	14.32	15.84	-1.52	
Year 3				
Percentage with				
No DMA ^a	50.78	47.83	2.95	<0.01
More than 0 and up to 90	43.74	43.18	0.52	
More than 90	5.48	8.99	-3.45	
Ratio of Controller Medications to Total Asthma Medications				
Mean of Ratio of Controller Medications DMA to Controller plus Rescue Medications DMA				
Year 1	0.43	0.43	0.00	0.942
Year 2	0.45	0.44	0.01	0.812
Year 3	0.55	0.52	0.03	0.260

Source: Monroe Plan for Medical Care prescription drug claims and enrollment data.

Note: Includes all children with asthma who are enrolled in the Monroe Plan, are at least 2 years old and younger than 19, have a diagnosis of asthma (493.xx) on any medical claim during the year before or in the intervention period (before January 2010), and are affiliated with a treatment or control group practice. Years 1, 2, and 3 correspond to each child's first, second, and third year of program eligibility, respectively.

Because children in the study population are enrolled for different amounts of time, we weight results according to number of days enrolled during the intervention period. We normalize weights so that they sum to the total number of sample members. We adjusted standard errors for clustering at the practice level.

All estimates are regression-adjusted. For complete details, see Appendix A of the BCQII Final Report. For a list of medications examined, see Table 8 of Appendix A.

^aDMA is the sum of all the days' supply fields on Monroe pharmacy claims data for each sample member.

^bPDC is calculated by dividing adjusted DMA by the number days enrolled and multiplying by 100. The adjusted DMA subtracts any medication available that extends beyond December 31, 2008, from actual DMA.

APPENDIX B

PACE CHART AUDIT SURVEY TOOL


Preview Survey - Windows Internet Explorer

http://app.sgizmo.com/surveybuilder/preview_survey.php?id=66081

Preview Survey

PREVIEW: Physician Login & Patient Tracker Refresh View Page 1 Save and continue survey later

Physician Patient Tracker



Please complete the asthma chart review survey for each of the patients listed below.

Click the 'Start' link to begin each review.

To continue where you left off, or to edit previous answers click the 'Continue/Edit' link.

To refresh the Survey Status column click on the 'Refresh Progress List' button.

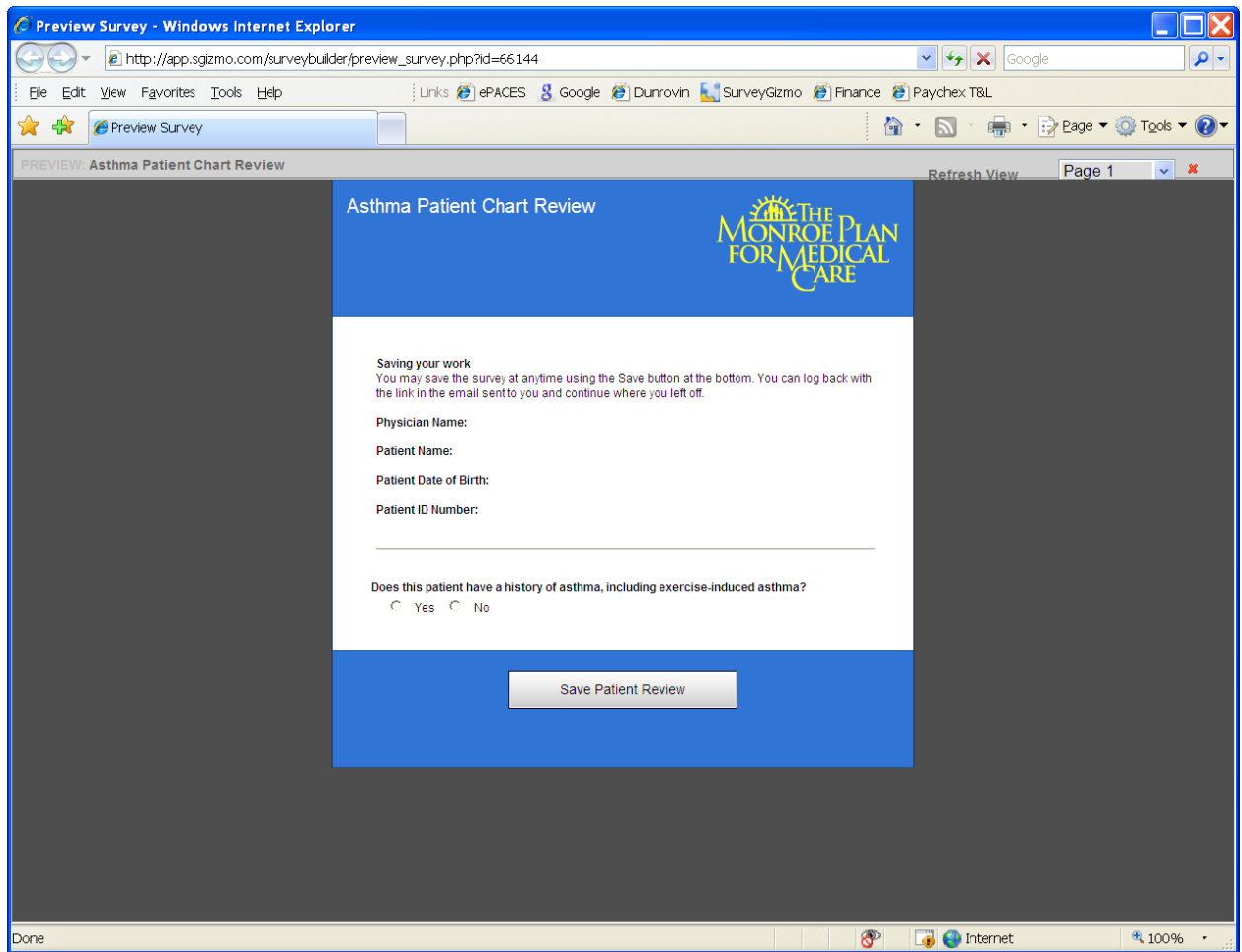
After completion of the reviews click on the 'Next Page' button at the bottom of this page.

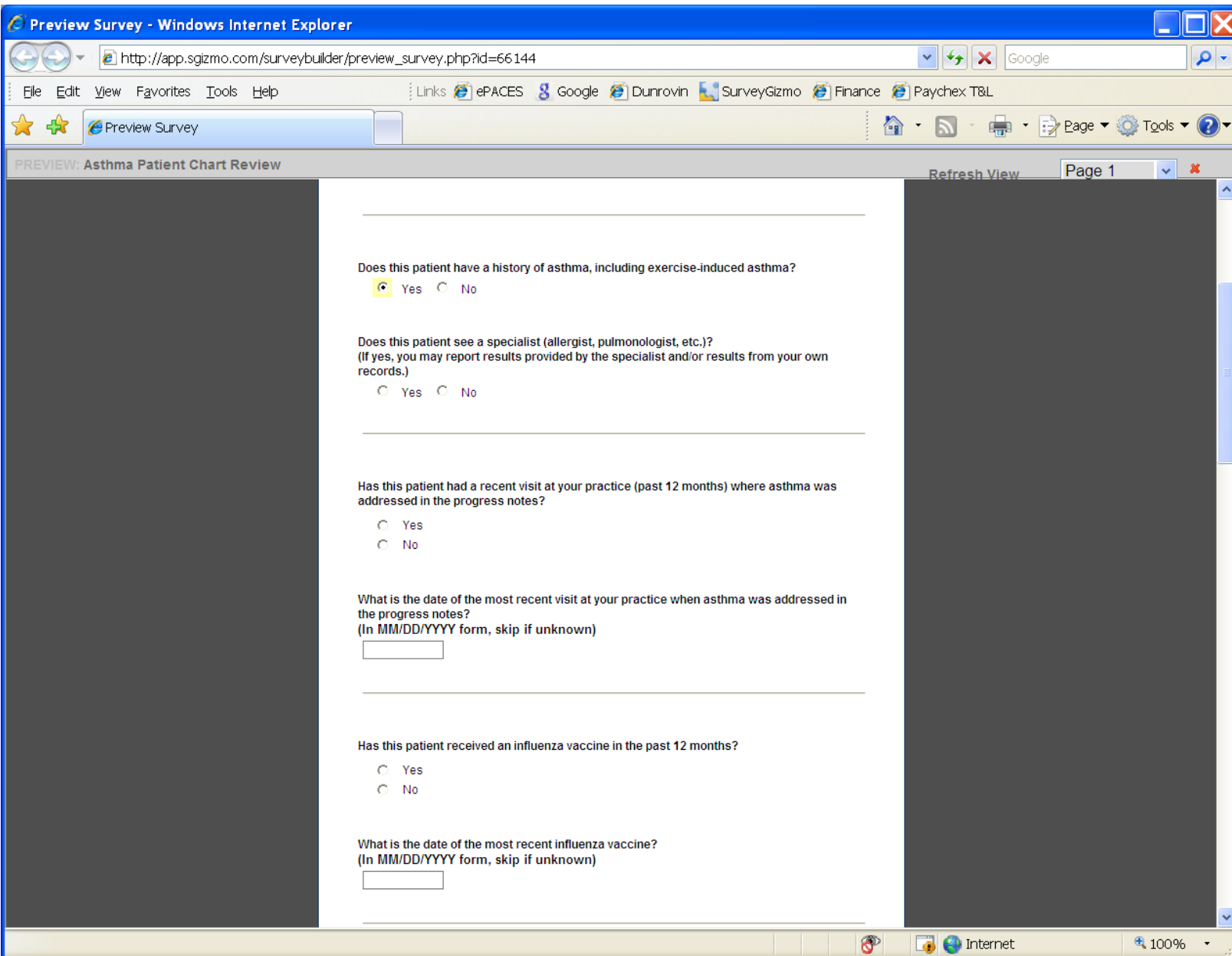
We have the following asthma patients on record for your practice.

Physician	Patient Name	ID	DOB	Survey Status	Link
Stockman, John	Simpson, Homer	1364A5678	03/07/1971	Not Started	Continue/Edit
Stockman, John	Duck, Daffy	AD55512C	05/11/2001	Not Started	Start
Stockman, John	Orton, Kyle	BG44467T	10/07/1982	Not Started	Start
Schneider, John	Mouse, Minnie	CE85423T	03/07/1871	Finished	Continue/Edit
Schneider, Marilyn	Manson, Shirley	5897D1235	12/09/1937	Not Started	Start
Stankaitis, Mary	Colbert, Stephen	7957D3546	01/20/1939	Not Started	Continue/Edit
Bayer, Marilyn	O'Donnell, Rosie	AD22245C	01/24/1957	Not Started	Start
Bayer, Marilyn	Martin, Steve	DA94333T	04/04/1946	Not Started	Start
Bayer, Marilyn	Pitt, Brad	KK19785P	06/25/1970	Not Started	Start
Bayer, Mairlyn	Brown, James	GA98225Y	01/07/1979	Not Started	Start

(There can be a delay of a few minutes to see updates)

Done Internet 100%





Preview Survey - Windows Internet Explorer

http://app.sgizmo.com/surveybuilder/preview_survey.php?id=66144

File Edit View Favorites Tools Help Links ePACES Google Dunrovin SurveyGizmo Finance Paychex T&L

Preview Survey

PREVIEW: Asthma Patient Chart Review Refresh View Page 1

Did the patient report symptoms of wheezing, coughing or shortness of breath during the month preceding the visit?

	Yes	No	Not Recorded
Daytime Symptoms more than 2 days/week	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nocturnal Symptoms more than 2 days/week	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Activity-related symptoms more than 2 days/week	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Use of quick-reliever (beta-agonist or rescue) medications more than 2 days/week	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

For the next two questions please use the following as a control guide:

	Well Controlled	Somewhat Controlled	Poorly Controlled
Symptoms	2 d/wk	> 2 d/wk	Throughout the day
Nighttime Awakenings	2 times/mo	1-3/ wk	4/ wk
Interference with normal activities	None	Some Limitation	Extremely limited
Short acting B-agonist use for symptom control	2 d/wk	> 2 d/wk	Several times/day

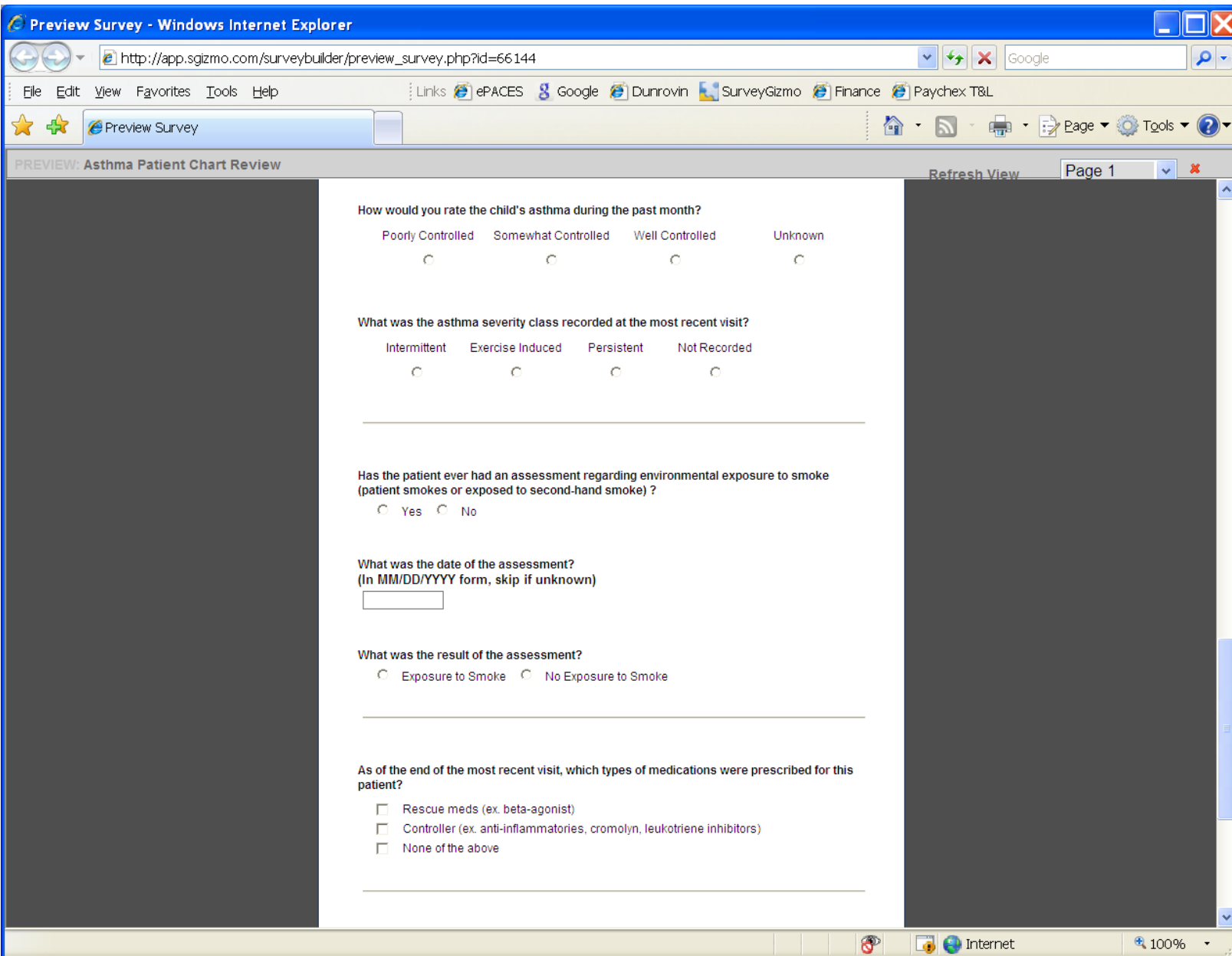
Based on your practice's interaction with the parent/guardian/child, how do you think they would rate the child's asthma during the past month?

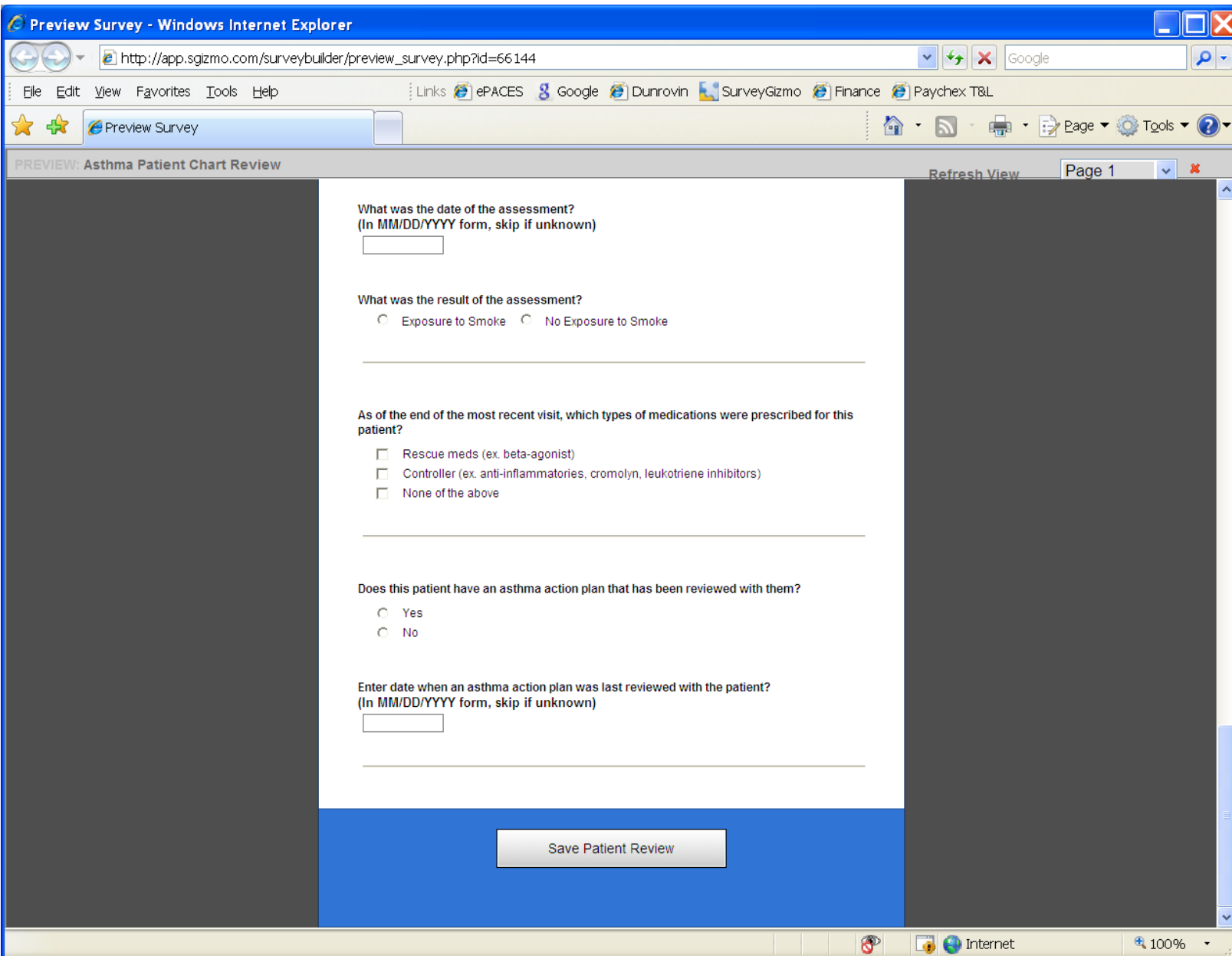
Poorly Controlled Somewhat Controlled Well Controlled Unknown

How would you rate the child's asthma during the past month?

Poorly Controlled Somewhat Controlled Well Controlled Unknown

Internet 100%





The screenshot shows a web browser window titled "Preview Survey - Windows Internet Explorer". The address bar contains the URL "http://app.sgizmo.com/surveybuilder/preview_survey.php?id=66081". The browser's menu bar includes "File", "Edit", "View", "Favorites", "Tools", and "Help". The toolbar shows various icons for navigation and utility. The page content is titled "PREVIEW: Physician Login & Patient Tracker" and includes a "Refresh View" button and "Page 1" indicator. A blue header bar contains the text "Physician Patient Tracker" and the logo for "THE MONROE PLAN FOR MEDICAL CARE". The main content area is a white form with the instruction "Please enter your contact and location information." and several input fields: "First Name", "Last Name", "Title", "Practice Name", "Street Address", "Suite/Office", "City", "State", "Zip Code", "Email Address", and "Phone Number". At the bottom of the form, there is a question: "All the patient chart reviews are complete and I am ready to submit the survey. I understand that I may not return to the survey after submitting this question." with radio button options for "Yes" and "No". The browser's status bar at the bottom shows "Done", "Internet", and "100%".

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