

RESEARCH REPORT

Medicaid Managed Care in Kentucky

Final Report

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Executive Summary

This is the final report in a series prepared during a three-year evaluation of the statewide implementation of risk-based managed care in seven of Kentucky's eight Medicaid regions in November of 2011. Kentucky Medicaid had already implemented managed care in the eighth region, which includes Louisville, in the late 1990s. The evaluation, which was carried out by researchers from the Urban Institute, the University of Kentucky, and Georgia State University, was designed to assess the short-term effects of risk-based managed care implementation on the major partners (beneficiaries, providers, plans, and the state) and gain an understanding of the basic effects on the provision of care. The study was funded by the Foundation for a Healthy Kentucky, which convened an advisory group for the evaluation that included representatives from key provider and advocacy groups, the Department for Medicaid Services within the Kentucky Cabinet for Health and Family Services, the state legislature, and other state agencies. This advisory group met multiple times throughout the course of the evaluation and provided guidance and insights to the research team.

This report synthesizes the key findings from the evaluation's qualitative and quantitative analyses. The qualitative analysis highlights implementation issues and beneficiary perspectives identified and discussed in our year one and year two reports. This analysis is based on stakeholder interviews, document review, and information obtained in 10 focus groups conducted statewide in July 2013 to provide insights about beneficiary experiences and enrollees' perceptions of changes to care under managed care. The quantitative component, which is based on claims and encounter data provided by the Kentucky Cabinet for Health and Family Services, assesses how service use and spending patterns changed between 2010 and 2013 for the Medicaid enrollees living in the counties that moved from fee-for-service to capitated managed care.

Our first-year implementation assessment noted significant problems associated with the 2011 rollout of managed care. These problems, due in large part to the compressed time frame of the initial implementation, included

- financial difficulties for plans, which led to the exit of one of the three managed care plans;
- increased administrative and financial burdens on providers related to prior authorization, claims denials, coding and billing procedures, all of which differed across plans, and communication problems between plans and providers; and
- lack of adequate mechanisms in state government to effectively oversee managed care plans.

We found that many of these issues had been resolved in the second year of managed care implementation:

- a stronger financial position for the remaining managed care plans; plan leadership indicated they were committed to remaining in the state;
- fewer provider reports of payment problems related to billing and coding procedures under managed care;
- plans' implementation of case management programs targeting the patients with the highest needs and costs;
- increased Cabinet oversight of the managed care plans (including contracting with an outside organization to monitor quality and access to care in each plan) ,and steps to facilitate greater collaboration and communication among key stakeholders; and
- focus group participants' reports that they were generally experiencing good access to care under managed care, though some complained about prior authorization requirements; particular concerns surfaced about access to behavioral health services.

In the third year of managed care implementation, other major policy changes were introduced in Kentucky with potentially profound impacts on the Medicaid service delivery system and its ability to meet the needs of enrollees. The state contracted with new managed care plans to provide services to Medicaid enrollees in the seven regions, and on January 1, 2014, Kentucky expanded its Medicaid program under the Affordable Care Act, which led to a substantial increase in Medicaid enrollment. Subsequently, more federal funds were allocated to federally qualified health centers; Medicaid reimbursement for primary care was increased (the fee increases were implemented through 2014, beginning in 2013 with federal funding); and the state implemented major policy changes aimed at expanding the supply of behavioral health services. Our assessment of the third year of managed care implementation found

- little disruption in administrative processes and cabinet oversight of managed care caused by the addition of the new plans;
- continued improvement in health plan administrative processes and expansion of case management programs;
- an expansion of behavioral health services available to Medicaid enrollees and of the types of providers available to offer behavioral health services, with concomitant uncertainty about the

future of the community mental health centers and the implementation of the new behavioral health services and provider types; and

- concerns about the ability of the Medicaid delivery system to meet the health needs of the newly enrolled population.

Using Medicaid administrative claims and enrollment data from 2010–13, we examined changes in service use and spending patterns following the adoption of managed care; given that the new managed care organizations were introduced in November 2011, our estimates should be viewed as evidence of relatively early, short-run changes. An important limitation on our analyses is the completeness of the encounter data generated by the managed care organizations: the state’s external quality review organization identified several areas for which data were incomplete, so the actual rate of service provision may be greater than documented by the encounter data. In addition, though we did not identify any major policy or health system change that could account for these patterns, we cannot rule out the possibility that other factors, besides managed care, are driving the spending and service use reductions, because our study design did not utilize a randomized experiment.

According to our analysis, the implementation of managed care was associated with reductions in Medicaid spending and service use. Although the direction of the change is uniform across almost all categories of service, the estimated magnitude depends on the type of service, the population being considered, and whether we adjust for other covariates that we would expect to be correlated with health care consumption. These findings suggest that the implementation of Medicaid managed care generated savings to the state in the form of lower Medicaid spending on health care services for adults and children covered under Medicaid for a full year or more.

In some cases, the experiences of other states led us to expect that managed care organizations would be able to use their expertise to reduce use and spending relative to what prevailed under fee-for-service. For example, reductions in inpatient and emergency room spending, along with some evidence of increases in outpatient hospital and community mental health center spending, are consistent with managed care shifting care to lower-cost clinical settings when doing so is clinically appropriate. This concept is also supported by the increase in preventive care observed among nonelderly adults, as well as the observed reductions in avoidable hospitalizations, emergency room visits, and hospital readmissions. In contrast, the observed reductions in preventive visits for children, if accurately documented in the encounter data, were surprising and run counter to the expectations typically associated with managed care. With respect to early and periodic screening, diagnosis, and treatment (EPSDT) visits, the evidence was mixed. Our analysis of the available encounter data for our

analytic sample suggested reductions in paid EPSDT visits following the implementation of managed care, while aggregate data included in the Centers for Medicare and Medicaid (CMS) 416 reports for Kentucky suggest no consistent pattern over time. In terms of behavioral health, our results are mixed. We find that Medicaid managed care is associated with increases in the likelihood of having any targeted case management services among those with a mental health diagnosis, but we also find reductions in the likelihood of having a prompt outpatient follow-up for nonelderly adults discharged from a mental health hospital and larger overall reductions in annual spending for those with a mental health diagnosis.

Taken together, the qualitative and quantitative findings indicate both potential improvements and declines in care under Medicaid managed care through 2013 relative to the prior fee-for-service delivery system. However, because 2014 was a time of substantial change in Kentucky's Medicaid program and in the behavioral health system, the measures tracked in this report may have changed since 2013. Moving forward, these results suggest the need for continued monitoring of enrollee utilization to determine with confidence whether the reductions we observe in the data represent true declines in medical care consumption or if they are being driven by data management issues. Ongoing monitoring is especially important for services in which reductions or mixed results raise potential concerns about quality of care, such as preventive care and EPSDT visits for children, and outpatient follow-up for adults discharged from mental health hospitals. In addition, it will be important for future analysis to consider and evaluate objective measures of enrollee health (e.g., infant mortality) to assess how these outcomes are changing.

If we assume our estimates represent true reductions in use, a natural follow-up question is whether these reductions have adverse effects on health outcomes. This question is very difficult to answer with the available data. Our attempts to evaluate quality of care centered around service use we would expect to observe if there were reductions in physical health care quality and enrollee health status, such as avoidable inpatient stays and ER visits, as well as hospital readmissions. These measures all suggested increases in quality, as all of them decreased after the implementation of MMC. We found mixed results for the quality measures related to behavioral health, with positive findings with respect to receipt of targeted case management services but reductions in extent of prompt follow up following a mental health hospital discharge for adults. Without objective measures of enrollee health status it is not possible to answer this question definitively. In addition, a one- or two-year time horizon may be insufficient to evaluate the association between MMC and health outcomes, even if we had objective measures of health.

Beyond the present findings, however, other reports have identified some areas of concern, such as the behavioral and preventive health care provided by the managed care organizations serving Medicaid enrollees in Kentucky, relative to national benchmarks. The evidence suggests a need for systematic real-time monitoring of the care Medicaid enrollees receive under managed care along with an assessment of contractual and other policy changes that would lead to improved outcomes for the growing population served by Medicaid managed care organizations in the state.

Introduction

This report presents findings from a three-year evaluation of managed care implementation and its effects in Kentucky's Medicaid program. The state received federal approval to implement managed care from the Centers for Medicare and Medicaid Services on September 8, 2011, and transitioned approximately 550,000¹ Kentucky Medicaid enrollees from a fee-for-service delivery system with a primary care case management component (called Kentucky Patient Access and Care, or KenPAC) into risk-based managed care two months later. KenPAC had provided monthly payments to primary care providers to manage patient care for an assigned group of patients. The transition to risk-based managed care represented a major change for both providers and patients in the delivery and administration of health services.

The move to Medicaid managed care (MMC) took place in seven of the state's eight Medicaid regions (see figure 1) for many groups of Medicaid enrollees, including nondisabled children and parents and disabled adults and children who were not dually enrolled in Medicare. Previously, in these seven regions, a large number of enrollees were served through KenPAC. Although theoretically the primary care provider was responsible for referrals for most specialty services under KenPAC, the degree to which primary care providers actually coordinated care for assigned patients under KenPAC was not routinely monitored by the state or rigorously evaluated. Currently, five managed care plans (Anthem, Coventry, Humana, Passport, and WellCare) provide services to Medicaid enrollees outside of Region 3 (table 1), with 79 percent of managed care enrollees in these regions served by WellCare and Coventry in these seven regions as of January 2015.

TABLE 1

Summary of Managed Care Member Enrollment, June through January 2015

Area	Anthem	Coventry	Humana	Passport	WellCare	Fee-for-service	Total
Region 3	0	25,576	39,349	176,488	32,028	26,620	300,061
All other regions	66,689	253,142	68,788	62,513	374,204	93,351	918,687
Total	66,689	278,719	108,137	239,001	406,232	119,971	1,218,748

Source: Kentucky Cabinet for Health and Family Services (http://chfs.ky.gov/NR/rdonlyres/E0411C91-E066-41A4-A945-DA10FB4C0354/0/ManagedCareMonthlyMemberCounts_20150601160951.pdf).

A second delivery system had been in effect for Medicaid in Jefferson County and 15 surrounding counties (Region 3) for the prior two decades. Region 3 has been operating under a risk-based managed care arrangement in Medicaid since the state began the Kentucky Health Partnership Program

preventive care. In addition, compared to fee-for-service, managed care may lead to improved fraud and abuse detection for those managed care organizations (MCOs) that have developed sophisticated detection processes using data mining, computer-assisted coding, and fraud detection algorithms.³

Multiple studies conducted over the past several decades have produced mixed findings on managed care in terms of impacts on spending and on both necessary and unnecessary service use and access to care.⁴ Most researchers conclude significant differences in the organizational structure and impacts of managed care are often associated with different types of managed care plans. In other words, if you have seen one managed care plan, you have seen one managed care plan.

This is particularly true in Kentucky, where two local nonprofit Medicaid MCOs were established during the national wave of MMC implementation during the mid-1990s to serve Medicaid recipients in the state's two urban areas (Louisville and Lexington). Despite being located less than 60 miles apart and serving relatively homogeneous sets of enrollees, these two plans were set up very differently and had different degrees of success in terms of reducing utilization and expenditures.⁵ The Lexington-centered plan ceased operations after roughly 18 months. The previous literature, or even Kentucky's previous experience with local nonprofit MCOs, is not likely to provide an accurate prediction about the impact of expanding MMC throughout Kentucky using private, for-profit MCOs today.

Kentucky's implementation of statewide risk-based managed care came during a period when national insurance companies were expanding their MMC business in other states as well.⁶ This increased interest was likely due in part to the promise of expanded Medicaid enrollment under the Affordable Care Act (ACA). Kentucky expanded Medicaid eligibility under the ACA to all Kentuckians with family incomes less than 138 percent of the federal poverty level beginning January 1, 2014 (as of May 2015, 28 states and the District of Columbia had expanded Medicaid under the ACA).

This expanded Medicaid eligibility brought changes to Kentucky's Medicaid program for stakeholders at all levels. Statewide an additional 375,000 Kentuckians enrolled in Medicaid by the end of 2014.⁷ With Kentucky expanding Medicaid under the ACA, the state has also greatly expanded the number of enrollees in the risk-based managed care program under Medicaid and expanded the number of managed care plans providing care.⁸ According to information from the Kentucky Cabinet for Health and Family Services, over 1 million Medicaid enrollees were covered through a risk-based managed care plan in June 2015, of whom roughly 75 percent lived in the seven regions that newly implemented managed care in 2011.⁹

The Evaluation

The Foundation for a Healthy Kentucky contracted with researchers at the Urban Institute, the University of Kentucky, and Georgia State University to conduct a three-year evaluation of the statewide adoption of capitated managed care in Kentucky's Medicaid program. The evaluation sought to address the following questions through analyses of claims and encounter data, focus groups, key informant interviews, and document review:

- How did beneficiaries, plans, and providers perceive managed care implementation?
- How effective was state oversight of managed care plans?
- To what extent were case management services included under managed care?
- To what extent did Medicaid spending and service use patterns change?
- Were certain populations more affected? How were patients with behavioral health conditions affected?

It is important to note that several other reports on Kentucky's MMC expansion have been produced, particularly with regard to the volatile first year. State Auditor Adam Edelen issued a special audit report in 2013 that found "egregious" violations of the state's announced contractual standards in many areas and recommended much closer oversight, more stringent sanctions for contractual noncompliance, and greater transparency with regard to the program's true costs and savings. The state's external quality review organization has also issued annual performance-related reports as required by the Centers for Medicare and Medicaid Services,¹⁰ and two years of Healthcare Effectiveness Data and Information Set (HEDIS) data are now available on the Department of Medicaid Services website.¹¹ The most recent report¹² found that the MMC plans were in "substantial compliance" 69 percent of the time across the 16 review areas assessed for each of the four MMC plans in 2014. This report flagged areas, such as rates of Board certification, HEDIS measures for well child visits, and initiation of alcohol and other drug dependence treatment, in which Kentucky's managed care program did not perform as well as other Medicaid programs around the country. The report also noted areas in which Kentucky's managed care program outperformed other Medicaid programs. These higher-performing areas included HEDIS measures of access, including timeliness of prenatal care, annual dental visits, and call answer timeliness and consumer satisfaction with aspects of care such as the ability to get care quickly and customer service as reported in Consumer Assessment of Healthcare Providers and Systems surveys.

Our evaluation complements these official reports by assessing perceptions of MMC implementation from the point of view of major stakeholder groups and of beneficiaries and by examining how spending and service use patterns changed for Medicaid enrolled adults and children after the implementation of managed care. The first evaluation report¹³ was based on a review of documents and interviews with 26 key stakeholders, of which 15 were providers. The interviews, completed about eight months after Medicaid beneficiaries were first enrolled in the health plans, were designed to gain an understanding of implementation issues affecting each of the major stakeholder groups across the central, eastern, and western regions of the state. The second evaluation report¹⁴ updated the first year's implementation assessment, drawing on telephone interviews with 19 stakeholders and 10 focus groups held with four groups of MMC members: parents of nondisabled children, parents of children with special health care needs, adults with disabilities, and adults using behavioral health services.

This final report from the evaluation provides a brief summary of the first- and second-year implementation findings and updates them with information on the third year of managed care implementation based on telephone interviews and follow-up with a subset of the stakeholders during the summer of 2014 and a review of key documents. This report also provides findings from the quantitative assessment of changes in spending and service use following the adoption of managed care for Kentucky's Medicaid recipients using Medicaid data from 2010 through 2013.

We found that despite a very bumpy first year of MMC implementation, driven in large part by the rapid transition timeline, by the second year, improvements were evident. Providers indicated that many of the initial billing and communication problems had been overcome; case management programs were expanding; the state had greatly improved their oversight of plans and quality and access monitoring; and, though one managed care plan had left the market, the two remaining plans held a stronger position in Kentucky's Medicaid market due to increased enrollment and higher capitated rates. During the third year of managed care implementation, there was increasing emphasis on case management services reported by plans and providers alike and a major effort to rectify workforce issues in the behavioral health system while expanding the mental health benefits available to Medicaid beneficiaries. These efforts took place in a rapidly changing policy environment, as Kentucky expanded Medicaid eligibility under the ACA while also making subsidized coverage available through kynect, the state-based marketplace in Kentucky.

According to our analysis, the implementation of managed care was associated with reductions in Medicaid spending and service use. Although the direction of the change is uniform across almost all categories of service, the estimated magnitude depends on the type of service, the population being

considered, and whether we adjust for other covariates that we would expect to be correlated with health care consumption. These findings suggest that the implementation of Medicaid managed care generated savings to the state in the form of lower Medicaid spending on health care services for adults and children covered under Medicaid for a full year or more. Though we did not identify any major policy or health system change that could account for these patterns, we cannot rule out the possibility that other factors, besides managed care, are driving the spending and service use reductions, because our study design did not utilize a randomized experiment.

In some cases, it was anticipated that managed care organizations would be able to use their expertise to reduce use and spending relative to what prevailed under fee-for-service. For example, reductions in inpatient and emergency room spending, along with some evidence of increases in outpatient hospital and community mental health center spending, are consistent with managed care shifting care to lower-cost clinical settings as appropriate. This concept is also supported by the increase in preventive care observed among nonelderly adults, as well as the observed reductions in avoidable hospitalizations, emergency room visits, and hospital readmissions. In contrast, the observed reductions in preventive visits for children and mixed results with respect to early and periodic screening, diagnosis, and treatment (EPSDT) visits for children were surprising and run counter to the theoretical predictions typically associated with managed care. In terms of behavioral health, our results are mixed. We find that Medicaid managed care is associated with increases in the likelihood of having any targeted case management services among those with a mental health diagnosis, but we also find reductions in the likelihood of having a prompt outpatient follow-up for nonelderly adults discharged from a mental health hospital.

Taken together, the qualitative and quantitative findings indicate both potential improvements and declines in care under Medicaid managed care through 2013 relative to the prior fee-for-service delivery system. However, because 2014 was a time of substantial change in Kentucky's Medicaid program and in the behavioral health system, the measures tracked in this report may have changed since 2013. Moving forward, these results suggest the need for continued monitoring of enrollee utilization to definitively determine if the reductions we observe in the data represent true reductions in medical care consumption or if they are being driven by data management issues. If we assume our estimates represent true reductions in use, a natural follow-up question is whether these reductions have adverse effects on health outcomes. This question is very difficult to answer with the available data. Our attempts to evaluate quality of care centered around service use we would expect to observe if there were reductions in physical health care quality and enrollee health status, such as avoidable inpatient stays and ER visits, as well as hospital readmissions. These measures all suggested increases in

quality, as all of them decreased after the implementation of MMC. We found mixed results for the quality measures related to behavioral health, with positive findings with respect to receipt of targeted case management services but reductions in extent of prompt follow up following a mental health hospital discharge for adults. Without objective measures of enrollee health status, it is not possible to answer this question definitively. In addition, a one- or two-year time horizon may be insufficient to evaluate the association between MMC and health outcomes, even if we had such objective measures of health.

Ongoing monitoring is especially important for services in which reductions or mixed results raise potential concerns about quality of care, such as preventive care and EPSDT visits for children, and outpatient follow-up for adults discharged from a mental health hospital. In addition, it will be important for future analysis to consider and evaluate objective measures of enrollee health (e.g., infant mortality) to assess how these outcomes are changing as well. Beyond the present findings, however, other reports have identified potential areas of concern,¹⁵ such as the behavioral and preventive health care provided by the managed care organizations serving Medicaid enrollees in Kentucky, relative to national benchmarks. The evidence suggests a need for systematic real-time monitoring of the care Medicaid enrollees receive under managed care along with an assessment of contractual and other policy changes that would lead to improved outcomes for the growing population served by Medicaid managed care organizations in the state.

Methods

Qualitative Component: Stakeholder Interviews and Focus Groups

This report draws on a review of public documents, including contracts, financial documents, reports, and newspaper articles; interviews with stakeholders over a three-year period; and 10 focus groups with MMC members in three regions of the state. We received Institutional Review Board approval for the qualitative components and the quantitative components of the project, which ensures the research design meets high ethical standards. In addition, we received Institutional Review Board approval from the Kentucky Cabinet for Health and Family Services.

The analysis in the qualitative component relied on multiple sources of information to identify common themes emerging from more than one type of information and themes that were heard from multiple focus group participants across different types of groups. This analytic process, called thematic content analysis, is designed to facilitate syntheses of responses across all qualitative data sources.

Key Stakeholder Interviews

Three rounds of stakeholder interviews were conducted over the course of the evaluation, occurring in person in the summer of 2012 and by telephone mostly in the summers of 2013 and 2014. The interview protocol designed to guide each semistructured interview used questions tailored to each respondent based on our research questions and earlier interviews conducted under the evaluation. Key topics covered included monitoring and oversight of MMC plans, enrollment, case management, provider networks, provider reimbursement, health plan reimbursement and financial sustainability, access to care (including behavioral health services and pharmaceuticals), and provider administrative changes due to managed care (including prior authorization, billing, denials, and appeals). Respondents were assured of anonymity and encouraged to provide honest opinions regarding MMC and its impact on their lives and on the groups they represented.

Semistructured interviews were conducted with state representatives, health plan representatives, provider representatives, and advocates. Twenty-six interviews were conducted in the first year of the

evaluation. Most of these interviews (15) were with provider representatives, with the remaining interviews split fairly evenly across the other categories. During the second year of the evaluation, we conducted 19 semistructured interviews, 8 of which were provider interviews, with the remainder distributed across the other categories. During the third year of the evaluation, which included a substantially smaller qualitative component than in the first two years, we conducted 9 total interviews, 4 with providers and the remainder split across the other groups.

The information collected in the interviews was supplemented with in-person meetings, conference calls, and e-mail communication with advisory group members and key state officials. When possible, we sought consistency in the stakeholders interviewed for the report, reaching out each subsequent year to those who had contributed their perspectives in the previous year. Appendix A lists the informants and their affiliations. Interviewees included representatives of the cabinet and legislative branch, the three health plans (Coventry, Kentucky Spirit, and WellCare) that initially enrolled Medicaid beneficiaries in the seven Medicaid regions in 2011, Passport health plan, providers and provider representatives, and patient advocates. Provider informants included individual practitioners, association staff, and financial or administrative staff.

Focus Groups

To obtain a patient perspective, 10 focus groups were conducted in July 2013 with four types of MMC members:

- parents of nondisabled children,
- parents of children with special health care needs,
- adults with disabilities, and
- adults using behavioral health services.

A moderator's guide was developed and adapted to each type of focus group. Key topics included family history of enrollment with Medicaid and with the health plans, education and enrollment processes, assignment to a primary care provider and access to primary care, ability to get needed health care services including dental and vision, behavioral health services, services for chronic conditions, ER care, access to pharmaceuticals, financial barriers to receipt of care, and case management. Though the focus group findings are not statistically representative of the Kentucky Medicaid patient population, the groups were designed to include Medicaid participants with differing levels of health needs and interaction with the health care system. For example, nondisabled children

generally use the health system less than children with special health care needs.¹⁶ Adults using behavioral health services were expected to be the most affected by MMC given the reductions in therapeutic rehabilitation services and changes to prior authorization for behavioral health medication that were documented in our first report. Adults with disabilities and children with special health care needs also tend to be high-need groups who use different types of health care services.

Participants in focus groups also were chosen to provide geographic diversity—with representation of managed care members in the regions of Lexington, Hazard, and Madisonville—and to reflect a range of conditions. These locations were chosen to reflect variations in experience deriving from the varied populations and provider markets in the state. For example, eastern Kentucky (Hazard) has high Medicaid enrollment and longstanding provider shortages, although a large proportion of providers who practice in the area have historically accepted Medicaid patients. In contrast, western Kentucky (Madisonville) has lower rates of provider participation in Medicaid. A majority of focus group participants were white (53 of 72) and female (67 of 72). Nine attendees were parents of children with special health care needs, 20 were disabled adults, 22 had behavioral health needs, and 24 were parents of nondisabled children. The Lexington region included 32 focus group participants, Hazard included 30, and Madisonville, 13.

Recruitment was designed to ensure participants represented a broad spectrum of Medicaid enrollees (not just, for example, those who had particularly good or bad experiences with managed care). For 8 of the 10 focus groups, recruitment took place through local provider organizations. Recruitment for the two behavioral health groups was managed by the local chapters of the National Alliance on Mental Illness. Further information on recruitment is included in appendix B.

Quantitative Component: Data and Analysis

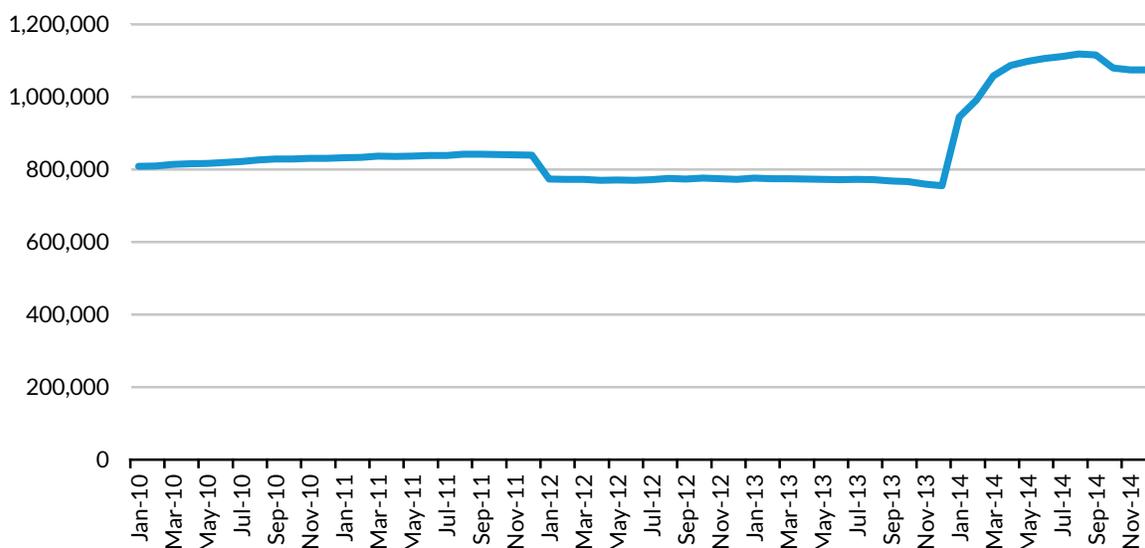
In this section, we first discuss Medicaid enrollment data and define the sample we use. We then discuss how we defined the spending and utilization measures we examined and how we defined the control variables to allow us to better isolate the effect of managed care on the utilization measures of interest. The statistical methodology is explained, and the limitations of the study are considered.

Medicaid Enrollment Data and Sample Definition

The Medicaid enrollment data used for this analysis were provided by the Kentucky Cabinet for Health and Family Services. The data include fields for demographic information, eligibility categories, and the date spans associated for each eligibility span. We received the data in two submissions. The first, covering the years 2010–12, was used for preliminary analysis; the second submission, covering the years 2012–14, was used for the final report. Our research team aggregated the raw eligibility data into month spans for analysis that include a separate row for each unique member-month of enrollment in each year from 2010 through 2014. Figure 2 provides the monthly count of unique Medicaid enrollees in Kentucky during this time period. Monthly Medicaid enrollment was roughly 800,000 members per month during 2010–11. Although it appears as though the second data submission provided by the cabinet slightly undercounts Medicaid enrollees during 2012 and 2013, this count did not affect our analyses because the undercounted groups (members with waiver eligibility status) were not affected by the implementation of managed care and thus were not in the scope of our analysis.

FIGURE 2

Monthly Medicaid Enrollment in Kentucky



Sources: Medicaid monthly enrollment data provided by the Kentucky Cabinet for Health and Family Services. The data for 2010–11 come from the initial data delivery from the state, and the data from 2012–14 come from the second data delivery.

When we restrict the raw member-month data described above to 2010 through 2013, we are left with 39,421,194 enrollee-months of data. To build the sample we used for our analysis, we opted to

restrict attention to nonelderly Medicaid enrollees without dual coverage or waiver program enrollment. This restriction allowed us to avoid confounding effects associated with Medicare, private insurance coverage, or different program benefits associated with waiver programs. In addition, we restricted attention to full years of Medicaid enrollment to ensure we accurately measured health care utilization (or lack of utilization) for each enrollee. Enrollees with part-year enrollment may receive health care from another source while not enrolled in the Medicaid program that would not show up in the Medicaid claims data. We also remove enrollees with missing or unusual information about their age, race, or region of residence. Finally, we removed 2012 data to avoid having early MMC implementation issues bias our results.

We made these sample restrictions in five steps. In step 1, we began with 39,421,194 enrollee-months and then removed enrollee-months in which the enrollee

- was over age 64;
- had dual Medicare coverage;
- had dual private coverage; or
- was enrolled in a waiver program, so would be carved out of managed care.

This first step reduced the sample by 8,311,108 enrollee-months, leaving us with 31,110,086 enrollee-months. In step 2, we restricted attention to full years of Medicaid enrollment, so that each enrollee contributed 12, 24, 36, or 48 months (1, 2, 3, or 4 years) to the sample. This step reduced the sample by another 8,469,962 enrollee-months, leaving us with 22,640,124 enrollee-months.

In step 3 we removed enrollee-months with missing or unusual values for potential control variables of interest:

- enrollee-months with eligibility category Supplemental Security Income (SSI) with Medicare (QMB, QI-1, SLMB, and QDWI);
- enrollee-months with missing race;
- enrollee-months with missing region; and
- enrollee-months with missing age.

Step 3 reduced the sample by another 2,083,596 enrollee-months, leaving us with 20,556,528 enrollee-months. In step 4 we removed enrollees who transitioned from the child to the adult subsample during our time frame and those few remaining enrollees in the sample carved out of managed care. This step reduced the sample by another 853,896 enrollee-months, leaving us with 19,702,632 enrollee-months. Finally, after dropping the 2012 data, we were left with our final sample of

14,528,676 enrollee-months generated by 621,611 unique enrollees. Because we restricted attention to full calendar years of enrollment, we can express these 14,528,676 enrollee-months equivalently as 1,210,723 enrollee-years. In our quantitative analysis, we will use the enrollee-year version of the data for ease of interpretation.

Spending and Utilization

Defining Spending Categories

MMC is expected to affect enrollee expenditures on health care. We measured monthly Medicaid health care expenditures annually for each enrollee in our sample, and we split the spending into the following 10 mutually exclusive categories based on the place of service code:

- Inpatient hospital
- Outpatient hospital
- Skilled nursing facility
- Community mental health center
- Emergency room
- Doctor's office
- Independent laboratory
- Home care
- Transportation provider
- Other (includes everything not listed here)

In our analysis we examined the change following the adoption of MMC on the amount of spending within each category (i.e., both the extensive and intensive margins; table 2) and the annual probability of having any spending in each of these categories (i.e., a measure of prevalence or the extensive margin; table 3). Table 3 illustrates that children transitioned into MMC had a 98 percent probability of having any annual expenditures in the pre-reform time period. These probabilities were slightly lower among the nonelderly adults in our sample. Among children, the highest-probability spending categories are outpatient, office, and ER spending. Among nonelderly adults, the highest-probability spending categories are outpatient, office, ER, and lab spending.

TABLE 2

Differences in Annual Spending by Category (includes 0 and non-0 spending years)

Spending categories (= average annual spending in this category)	Children	Adults
	New MCO treatment	New MCO treatment
Sample size – pre	430,450	168,213
Sample size – post	243,633	81,351
Annual spending – pre	\$2,103	\$5,490
Annual spending – post	\$1,842	\$5,329
Skilled nursing spending – pre	N/A	\$74
Skilled nursing spending – post	N/A	\$47
Inpatient spending – pre	\$280	\$1,674
Inpatient spending – post	\$240	\$1,703
“Other” spending – pre	\$565	\$153
“Other” spending – post	\$388	\$104
Outpatient hospital spending – pre	\$346	\$1,541
Outpatient hospital spending – post	\$389	\$1,855
Office spending – pre	\$642	\$1,065
Office spending – post	\$477	\$740
Home care spending – pre	\$36	\$285
Home care spending – post	\$51	\$244
Community mental health spending – pre	\$93	\$96
Community mental health spending – post	\$103	\$105
ER spending – pre	\$47	\$128
ER spending – post	\$45	\$128
Lab spending – pre	\$11	\$280
Lab spending – post	\$9	\$208
Transportation spending – pre	\$2.2	\$42
Transportation spending – post	\$1.7	\$32

Source: 2010, 2011, and 2013 analysis of Kentucky’s Medicaid enrollment and claims.

TABLE 3

Differences in Annual Spending Prevalence by Category

Spending categories for extensive margin only (= 1 for any annual spending in this category)	Children New MCO treatment	Adults New MCO treatment
<i>Sample size – pre</i>	430,450	168,213
<i>Sample size – post</i>	243,633	81,351
Any annual spending – pre	97.89%	94.08%
Any annual spending – post	97.33%	94.44%
Any skilled nursing spending – pre	N/A	0.33%
Any skilled nursing spending – post	N/A	0.32%
Any inpatient spending – pre	5.42%	20.19%
Any inpatient spending – post	4.50%	18.69%
Any “other” spending – pre	57.03%	20.12%
Any “other” spending – post	10.28%	4.78%
Any outpatient hospital spending – pre	53.72%	74.97%
Any outpatient hospital spending – post	54.00%	75.88%
Any office spending – pre	93.15%	88.72%
Any office spending – post	91.23%	87.47%
Any home care spending – pre	9.11%	22.30%
Any home care spending – post	7.83%	19.36%
Any community mental health spending – pre	7.50%	10.34%
Any community mental health spending – post	9.15%	12.24%
Any ER spending – pre	39.57%	51.09%
Any ER spending – post	37.79%	50.67%
Any lab spending – pre	15.26%	48.19%
Any lab spending – post	14.88%	50.85%
Any transportation spending – pre	1.10%	6.97%
Any transportation spending – post	0.86%	6.76%

Source: 2010, 2011, and 2013 analysis of Kentucky’s Medicaid enrollment and claims.

Defining Core Utilization Measures

In addition to looking at spending by service location, we constructed probabilities of annual utilization and associated counts for the following services:

- Inpatient hospital stays
- Hospital readmissions (after 7, 30, and 90 days)
- Avoidable ER visits
- Preventive care visits
- Dental visits
- Avoidable inpatient hospital stays
- ER visits
- Outpatient visits
- EPSDT visits

As described above, we measured utilization both by looking at the annual count of the number of visits of a particular type (which combines the extensive and intensive margin; table 4) and the probability of having at least one annual visit of a particular type (the extensive margin; table 5).

TABLE 4

Differences in Annual Utilization (includes 0 and non-0 utilization years)

Utilization categories (= average annual utilization of this type)	Children New MCO treatment	Adults New MCO treatment
<i>sample size - pre</i>	430,450	168,213
<i>sample size - post</i>	243,633	81,351
# inpatient - pre	0.067	0.263
# inpatient - post	0.046	0.231
# avoidable inpatient - pre	N/A	0.039
# avoidable inpatient - post	N/A	0.034
# 7-day readmits - pre	0.013	0.036
# 7-day readmits - post	0.010	0.028
# 30-day readmits - pre	0.025	0.086
# 30-day readmits - post	0.026	0.069
# 90-day readmits - pre	0.036	0.097
# 90-day readmits - post	0.032	0.082
# ER - pre	0.733	1.377
# ER - post	0.691	1.256
# avoidable ER - pre	0.452	0.848
# avoidable ER - post	0.423	0.761
# outpatient - pre	5.890	7.441
# outpatient - post	5.221	8.506
# preventive care - pre	0.701	0.132
# preventive care - post	0.646	0.137
# EPSDT - pre	0.695	N/A
# EPSDT - post	0.623	N/A
# dental - pre	1.202	0.659
# dental - post	1.181	0.599

Source: 2010, 2011, and 2013 analysis of Kentucky's Medicaid enrollment and claims.

TABLE 5

Differences in Annual Utilization Prevalence

Utilization categories for extensive margin Only (= 1 for any annual utilization of this type)	Children New MCO treatment	Adults New MCO treatment
Sample size – pre	430,450	168,213
Sample size – post	243,633	81,351
Any inpatient – pre	4.29%	16.86%
Any inpatient – post	3.35%	15.15%
Any avoidable inpatient – pre	N/A	2.84%
Any avoidable inpatient – post	N/A	2.52%
Any 7-day readmits – pre	1.05%	2.74%
Any 7-day readmits – post	0.86%	2.20%
Any 30-day readmits – pre	1.95%	5.24%
Any 30-day readmits – post	1.88%	4.53%
Any 90-day readmits – pre	3.17%	6.60%
Any 90-day readmits – post	2.73%	5.56%
Any ER – pre	40.07%	49.52%
Any ER – post	37.96%	48.01%
Any avoidable ER – pre	27.41%	36.83%
Any avoidable ER – post	25.87%	35.29%
Any outpatient – pre	88.53%	86.51%
Any outpatient – post	85.46%	87.50%
Any preventive care – pre	45.01%	11.64%
Any preventive care – post	44.01%	12.69%
Any EPSDT visits – pre	44.55%	N/A
Any EPSDT visits – post	42.60%	N/A
Any dental – pre	57.98%	29.56%
Any dental – post	59.32%	28.40%

Source: 2010, 2011, and 2013 analysis of Kentucky’s Medicaid enrollment and claims.

We identified inpatient stays within the Medicaid microclaims data by using the internal Kentucky Medicaid flag for inpatient stays based on facility codes. We compared this definition to the Healthcare Effectiveness Data Information Set (HEDIS) definition for inpatient stays, which also factor in specific ICD-9 codes, and found that unlike the HEDIS definition, the Kentucky Medicaid definition includes visits with primary mental diagnoses (ICD-9-CM, 290-316) and live birth diagnoses made to infants (ICD-9-CM, V30-V39).¹⁷ As table 5 shows, among children in the sample in the pre-reform period in counties that transitioned to MMC there was a 4.29 percent annual probability of having at least one inpatient stay. The corresponding probability is understandably higher among the nonelderly adults in the in the pre-reform period. These probabilities based on utilization counts match up well with the probabilities based on spending totals in table 3.

Next, for nonelderly adult inpatient stays, we identified which of these hospitalizations were considered “avoidable” by using an algorithm developed by the Agency for Health Care Research and Quality.¹⁸ This algorithm was developed with significant input from physicians and seeks to flag

inpatient hospitalizations that would have been avoided had the patient received appropriate primary care.¹⁹ Table 5 illustrates that the probability of any annual inpatient utilization was 16.86 percent in the pre-reform period, and the probability of any annual avoidable inpatient utilization was 2.84 percent. For both nonelderly adults and children with an inpatient discharge, we also flagged readmissions occurring after 7, 30, and 90 days. As shown in table 5, nonelderly adults have a higher annual likelihood of a readmission conditional on having an inpatient stay.

We identified ER visits by using the HEDIS definition, which consists of current procedural terminology (CPT) codes 99281-99285 or UB revenue codes 045x or 0981 or CPT codes 10040-69979 combined with a Place of Service code 23. Table 5 suggests that among nonelderly adults in counties that transitioned to MMC in the pre-reform period there was a 50 percent annual probability of having at least one ER visit. Children in the sample have significantly lower, but still sizable, ER visit probabilities. Using a commonly employed technique we also identify those ER visits that are considered avoidable for both children and nonelderly adults.²⁰ The sample means reported in table 5 suggest higher rates of avoidable ER use among nonelderly adults as compared to children.

Outpatient visits were defined using HEDIS definitions for office or other outpatient visits, which consist of a CPT code of 99201-99205, 99211-99215, or 99241-99245 or a UB revenue code of 051X, 0520-0523, 0526-0529, 0982, or 0983. Dental visits are defined using the HEDIS definition as well, which consists of the appropriate set of CPT and current dental terminology codes.²¹ As shown in table 5, the pre-reform annual dental utilization rate for children as 57.98 percent and 29.56 percent for nonelderly adults.

We defined EPSDT visits as paid visits meeting the following three criteria: (1) the visit was coded with either EPSDT provider type (provider type code: 45 – EPSDT Special Services) or EPSDT category of service (category of service code: 48 – EPSDT), (2) it included EPSDT CPT codes 99381-99395, and (3) the service recipient's age was under 21.²² Preventive care office visits were defined using the HEDIS definition, which consists of a CPT code of 99381-99387, 99391-99397, 99401-99404, 99411, 99412, 99420, or 99429. Table 5 suggests that the probability of having any annual preventive care or EPSDT visits were both below 50 percent for children in counties that transitioned to MMC.

Defining Behavioral Health Utilization Measures

Of particular interest is the effect of MMC on behavioral health use and outcomes. We examined a variety of behavioral health measures, including prompt (30-day) follow-up after mental health

hospitalization discharges, and overall community mental health center spending, as well as utilization for targeted case management services, crisis stabilization services, and rehabilitation services.

Our first measure isolates mental health related hospital discharges from inpatient mental health hospitals to see if those patients received a follow-up outpatient visit within 30 days. This guideline is based on the National Behavioral Health Quality Framework produced by the Substance Abuse and Mental Health Services Administration as well as information provided by the Agency for Healthcare Research and Quality.²³ The adult measure is based on transitions from mental health hospitals, and the child measure is based on transitions from acute care hospital psychiatric units.

We next measure spending on mental health related services by reviewing Medicaid recipient spending in Community mental health centers. Tables 2 and 3 present average annual spending by category of service with the results stratified by the adult and child samples for the pre and post periods. In the pre-reform period, children in counties that transitioned to MMC had a 7.5 percent chance of having any community mental health spending, and nonelderly adults in this group had a 10 percent chance of any such spending. In the post-period, we see that spending in this category increased by about 2 percentage points for both adults (from 10.34 to 12.24 percent) and children (from 7.50 to 9.15 percent).

Our final set of measures in table 6 address specific mental health related service use for recipients identified as having a mental health diagnosis. Specifically, we measure whether an enrollee received any targeted case management, crisis stabilization, or rehabilitation services. We defined these service types based on the Medicaid provider category of service codes for targeted case management, crisis stabilization, and rehabilitation services.

TABLE 6

Differences in Mental Health Care Utilization Prevalence

Utilization categories - extensive margin only (= 1 for any utilization of this type)	Children New MCO treatment	Adults New MCO treatment
Any targeted case management - pre	4.75%	3.46%
Any targeted case management - post	6.84%	4.26%
Any crisis stabilization services - pre	0.73%	0.27%
Any crisis stabilization services - post	1.07%	0.38%
Any rehabilitation services - pre	0.11%	0.08%
Any rehabilitation services - post	0.15%	0.10%
Prompt follow-up after an mental health discharge - pre	17.72%	39.42%
Prompt follow-up after an mental health discharge - post	18.05%	33.97%

Source: 2010, 2011, and 2013 analysis of Kentucky's Medicaid enrollment and claims.

Defining the Control Variables

To assess changes in service use and spending following the provision of Medicaid services by the new private MCOs, we controlled for a number of other factors measurable in the Kentucky Medicaid administrative data that could potentially influence enrollee utilization. Table 7 summarizes these factors for enrollees in our sample in counties that transitioned to MMC. It shows that roughly 50 percent of the children in our sample are female in the pre-period and 66 percent of the nonelderly adults are female during that same time period. The age distribution reported in table 7 reflects the eligibility rules for Medicaid and our sample restriction to those under age 65.

TABLE 7

Demographic Characteristics of Enrollees

Demographic characteristics	Children New MCO treatment	Adults New MCO treatment
Sample size - pre	430,450	168,213
Sample size - post	243,633	81,351
% Female - pre	49%	66%
% Female - post	49%	65%
% Nonwhite - pre	53%	23%
% Nonwhite - post	40%	14%
% Age 0-10 - pre	64%	N/A
% Age 0-10 - post	62%	N/A
% Age 11-18 - pre	36%	N/A
% Age 11-18 - post	38%	N/A
% Age 19-30 - pre	N/A	26%
% Age 19-30 - post	N/A	23%
% Age 31-40 - pre	N/A	25%
% Age 31-40 - post	N/A	25%
% Age 41-50 - pre	N/A	24%
% Age 41-50 - post	N/A	23%
% Age 51-64 - pre	N/A	25%
% Age 51-64 - post	N/A	28%
% Region west - pre	19%	14%
% Region west - post	18%	14%
% Region central - pre	49%	38%
% Region central - post	50%	39%
% Region east - pre	32%	47%
% Region east - post	32%	47%
% Region Passport - pre	N/A	N/A
% Region Passport - post	N/A	N/A
% KCHIP eligible - pre	15%	0.13%
% KCHIP eligible - post	15%	0.03%
% AFDC eligible - pre	29%	35%
% AFDC eligible - post	25%	35%
% SOBRA eligible - pre	47%	2%
% SOBRA eligible - post	51%	2%
% Foster care eligible - pre	3%	0.05%
% Foster care eligible - post	3%	0.01%
% SSI eligible - pre	3%	62%

Demographic characteristics	Children New MCO treatment	Adults New MCO treatment
% SSI eligible – post	3%	62%
% Other eligible – pre	3%	0.07%
% Other eligible – post	3%	0.11%
% Mental health diagnosis – pre	4%	27%
% Mental health diagnosis – post	5%	30%
Mean Charlson Index score – pre	0.115	0.569
Mean Charlson Index score – post	0.182	0.914

Source: 2010, 2011, and 2013 analysis of Kentucky’s Medicaid enrollment and claims.

The vast majority of children in our sample were eligible for Medicaid either through the SOBRA eligibility category, which broadly refers to pregnant women and children made eligible for Medicaid through the expansions of the 1980s; the Aid to Families with Dependent Children (AFDC) eligibility category; or the Kentucky Children’s Health Insurance Program (KCHIP) eligibility category.²⁴ Most nonelderly adults in our sample were eligible for Medicaid either through the SSI eligibility category or through AFDC. We saw little variation in the share of enrollees in each eligibility category in the post-reform period (2013) as compared to the pre-reform period (2010 and 2011). Among children there appeared to be a slight reduction in AFDC eligibility and a slight increase in SOBRA eligibility.

We included two explicit controls for enrollee health status. First, we included an indicator for whether the enrollee had a Medicaid mental health diagnosis or treatment. The mental health population was identified using ICD-9-CM 295-301. This indicator turns on in the year a Medicaid mental health diagnosis or treatment occurs and stays on throughout the rest of the observed months in the data. Table 7 shows that 4 percent of children in the sample had a mental health diagnosis or treatment in the pre- managed care period as compared to 27 percent of nonelderly adults. Second, we included a Charlson Comorbidity Index score for each Medicaid enrollee for each year they were enrolled. The index ranges from 0 to 13, with a higher score being indicative of worse health, and was based on diagnoses occurring during the particular calendar year for which the score was being calculated. Among children in counties that transitioned to MMC, the average annual Charlson score in the pre-period was 0.115, as compared to 0.569 for nonelderly adults in the same group at that time.²⁵

Statistical Methodology

To assess the changes in health care spending and utilization associated with the switch from fee-for-service to capitated managed care in Kentucky’s Medicaid program, we first assessed the changes

experienced by the Medicaid enrollees who live in the parts of the state that were transitioned into one of the new MCOs (i.e., the treatment group). This group consisted of all enrollees outside of Region 3 (see figure 1). This type of analysis can be thought of as a “pre/post” analysis because we are using over-time variation in the structure of these individuals’ Medicaid coverage to identify changes in our different outcomes of interest. Formally, we estimated the following model for enrollees in the treatment group:

$$annual_utilization_{it} = \beta_0 + \beta_1 POST_t + demographics_{it} \beta_2 + region_{it} \beta_3 + eligibility_categories_{it} \beta_4 + health_status_{it} \beta_5 + \varepsilon_{it} \quad (1)$$

Here i is a subscript representing individuals and t is a subscript representing calendar years 2010 through 2013. The dependent variable $annual_utilization_{it}$ is a generic variable that represents any one of the utilization or spending outcomes we analyze, such as an indicator for any annual ER visits (defined by utilization or spending), a count of the annual number of ER visits, or total annual spending on ER visits for enrollee i in year t . For ease of interpretation, we estimated all models by using ordinary least squares. The variable $POST_t$ is equal to 1 in years t in which the new MCOs are in place and 0 otherwise. In practice, this means $POST_t$ equals 0 for years 2010 and 2011 and 1 for year 2013 (2012 data were excluded from our analysis).

To isolate the effect of the new MCOs, we controlled for enrollee demographics ($demographics_{it}$), enrollee region of residence ($region_{it}$), enrollee eligibility category ($eligibility_categories_{it}$), and some measures of enrollee health status ($health_status_{it}$). In addition, in some specifications, we included individual enrollee fixed effects, which control for all observable and unobservable characteristics of each enrollee that do not vary over time.

We then compared changes for enrollees in the regions that newly adopted managed care to those occurring for enrollees in Region 3. Ideally, the comparison group would be identical to the treatment group other than their move from fee-for-service Medicaid to MMC. A natural candidate for a comparison group would be Medicaid enrollees in Region 3, because those enrollees were in an MMC plan in all four years.²⁶ These enrollees should arguably be affected by underlying changes in the state health care system or the state economy in the same way as those in the treatment group. However, as indicated above, Medicaid introduced major changes in its managed care program in Region 3 in 2013, opening up the region to competition, which resulted in two additional plans providing services to Medicaid enrollees. Therefore, we cannot consider Region 3 as a clean comparison group for our analysis. Because the analysis was not conducted in the context of a randomized trial and no appropriate comparison group was available, we cannot rule out the possibility that other factors, besides managed care are driving changes we observe.

When reporting our empirical results based on this methodology, we make note of results that are statistically significant at the 5 percent level (or lower). Given our large sample size, our estimates are extremely precise, which implies we achieve statistical significance with most estimates.

Data Limitations

This project used multiple sources of data for the qualitative and quantitative analyses. Our primary data sources for the quantitative analysis were administrative health care claims and encounter data provided by the Kentucky Cabinet for Health and Family Services. These data sets consisted of extracts from the Medicaid eligibility and membership systems, the provider database, and the various billing claims subdivisions (pharmacy, inpatient facilities, outpatient facilities, and professional services). We acknowledge that administrative data have several known limitations. First, claims are usually generated as part of the payment process, which requires complete and accurately coded claims so providers receive prompt payment for services provided. Because part of our analysis covers MCOs, the paid claims submitted by the MCOs are not required for MCO reimbursement from the state, but they are used as part of the quality control process mandated by the Kentucky Department for Medicaid Services. Medicaid also uses the billing totals from the encounters to verify rate risk profile information for each MCO, so although the encounter claims are not necessarily used to pay individual provider visits, a lack of their accuracy carries some risks for the MCOs. In addition, we did not have access to claims submitted by providers to the MCOs that were not paid. Thus the use of these paid encounter claims remains a possible source of bias, because they may be incomplete and may not reflect all the services Medicaid members received from the MCOs.

Second, the data extracts supplied by the Department for Medicaid Services to our research team may be incomplete, because the data extract process involved identification, selection, and movement of large amounts of data from the operational Medicaid Management Information System to our research data center. The data extracts analyzed for this project involve hundreds of data fields and millions of rows of data across the various file types. To minimize potential data errors, we completed multiple data validation exercises, such as comparing counts of claim types and sums of payment fields, with the Department for Medicaid Services. We consistently found that our analysis file matched closely with the corresponding totals from the source file. Finally, there is the possibility our team misinterpreted claims information or billing practices across the MCOs. We assumed the billing and coding of provider types, diagnoses, and procedures remained consistent in the pre-period and post-

period, but it is possible the billing and coding by the MCOs were different from the fee-for-service period and potentially different from each other.

We performed additional data validations when possible. We compared the claims data totals from the Department for Medicaid Services with data from the Kentucky Hospital Discharge data set and with data from other public sources such as the Federal Center for Medicare and Medicaid Services. We also submitted aggregate summaries of the data to Kentucky Medicaid for additional validation. None of our validation exercises suggested problems with our data extracts.

Findings

In this section, we share new findings based on the information gathered on the third year of managed care implementation and provide a high-level overview of the experience in the first two years of managed care implementation from the qualitative component of the evaluation.²⁷ This discussion is followed by an in-depth review of the quantitative findings that have not been previously reported.

Qualitative Study of Implementation

During the evaluation period (2012–15), Kentucky used six managed care plans (WellCare, Coventry, Kentucky Spirit, Anthem, Humana, and Passport) to serve Medicaid enrollees in the seven regions that adopted managed care in 2011. Table 8 shows the enrollment breakdown across the three original plans (WellCare, Coventry, and Kentucky Spirit) that served these seven regions starting in November 2011. The data show enrollment through the third quarter of 2013, after Kentucky Spirit left the market but before the state’s Medicaid expansion was implemented (see table 1 for a distribution of health plan enrollment in January 2015).

TABLE 8

Health Plan Enrollment Q4 2011 through Q3 2013

	Coventry	Kentucky Spirit	WellCare
2011, Q4	221,395	180,365	128,901
2012, Q1	234,440	145,700	149,402
2012, Q2	240,410	143,500	153,590
2012, Q3	237,596	145,400	158,490
2012, Q4	199,980	135,800	207,000
2013, Q1	210,704	134,384	228,245
2013, Q2	206,099	130,593	225,016
2013, Q3 ^a	259,076	0	273,842

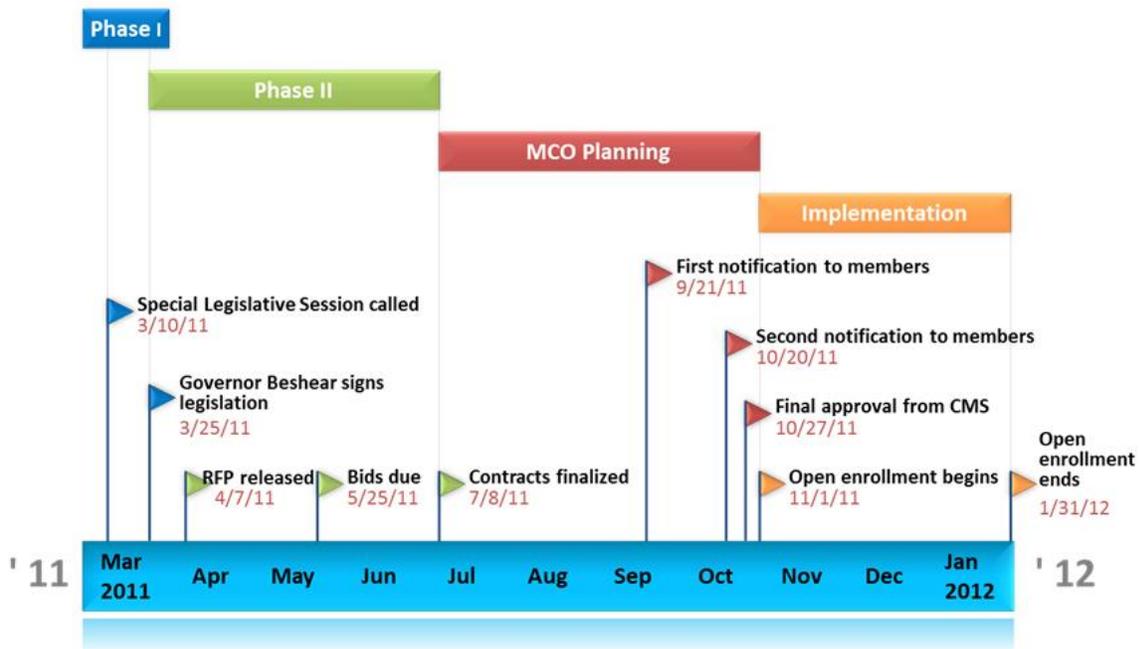
Source: Citi Investment Research and Analysis.

^aData are from Kentucky Medicaid Statistics (<http://www.chfs.ky.gov/dms/stats.htm>).

In our first annual report, based on the first round of semistructured interviews, we reported that stakeholders at that time perceived numerous problems with MMC. Many of these problems were attributed primarily to the extremely short implementation timeline (figure 3).

FIGURE 3

Kentucky's Medicaid Managed Care Implementation Timeline



Stakeholders were concerned at that time that the state's oversight of MMC plans was still underdeveloped. The state agency administering Medicaid was transitioning from operating a fee-for-service system to oversight of managed health plans and was reorganizing to add staff and expand their expertise in MMC. Providers and plans were also experiencing administrative and financial difficulty adapting to MMC. Some of the perceived administrative issues included (1) communication difficulties between plans and providers; (2) increased administrative and financial burdens for providers, including late payment; (3) new coding and administrative systems adopted by the plans; and (4) problems with claims denials, often due to new formulary restrictions or prior authorization procedures.

These difficulties and payment rate negotiations led some providers to refrain from contracting with some or all of the MCOs. A contract dispute led to litigation between a major regional provider, Appalachian Regional Healthcare and Coventry health plan, which tried to terminate Appalachian Regional Healthcare's participation status.²⁸ During the first year following implementation of managed care, all three plans experienced financial losses, although these problems abated toward the end of 2012 for Coventry and WellCare (table 9). The third plan, Kentucky Spirit, did not experience improvements in its medical loss ratio and exited the program during the summer of 2013.

TABLE 9

Medical Loss Ratio by Health Plan (calendar year)

	Coventry	Kentucky Spirit	WellCare
2011, Q4	116.6%	103.3%	102.5%
2012, Q1	120.7%	104.5%	103.9%
2012, Q2	110.5%	119.7%	107.6%
2012, Q3	108.0%	117.1%	104.6%
2012, Q4	95.9%	123.5%	99.2%
2013, Q1	91.8%	115.9%	87.9%
2013, Q2	87.2%	114.6%	84.6%

Sources: For Coventry and WellCare, Citi Investment Research and Analysis; for Kentucky Spirit, statutory filings available from the National Association of Insurance Commissioners.

In the second year, the state substantially increased its capacity to monitor and oversee the health plans, and several changes were effected that resulted in greater program stability. For example, the exit of Kentucky Spirit from the Medicaid market created additional enrollment for Coventry and WellCare as Kentucky Spirit enrollees were auto-assigned to them²⁹ based on an algorithm that accounted for previous provider relationships, maintaining consistency within the household, and load balancing across plans. The financial position of the two plans also improved during the second year (table 9).

In the second year of interviews, providers and plans also reported making progress in their coding and billing procedures. Providers reported they were in a stronger financial position, and plans had begun targeting care management programs toward high-cost users. Kentucky Medicaid also implemented the ACA-based temporary increase in Medicaid reimbursement to Medicare rates for primary care providers, although the programming changes necessary to support the adjustments in reimbursement led to a delay in implementation.³⁰ Providers were able to begin billing at the higher rate in April 2013. Although no definitive assessment is available on whether and how the primary care fee increase affected access to primary care in Kentucky's Medicaid program, a health plan informant indicated that the increased rates may have helped maintain provider networks for Medicaid patients.

The perceptions of MMC enrollees, as reported in focus groups conducted in year two of the evaluation, were also generally positive. Only a small percentage of focus group participants reported any serious problems after the adoption of managed care. A difficulty that surfaced in the focus groups involved heightened concerns about access to effective pharmaceuticals for those enrollees with physical and behavioral health needs.

Although Kentucky's MMC program had stabilized to an extent by year two of the evaluation, in year three, Kentucky expanded its Medicaid program, which brought several new changes. The addition

of hundreds of thousands of new Medicaid enrollees and new plans in the seven regions were among the key changes. The state’s second-year managed care progress report indicates that Medicaid enrollment grew 40.8 percent between August 2013 and August 2014, and enrollment in managed care grew 48.2 percent over this period.³¹ The state also implemented new policies to improve access to behavioral health care and substance abuse services by adding new provider types and new benefits.

Beyond WellCare and Coventry, the two plans that had continued to provide services to the managed care population in 2013 in the seven regions outside the greater Louisville region, three additional managed care plans (Humana, Passport, and Anthem) began providing services to the Medicaid expansion population in those areas. Initially, the three new plans only served expansion enrollees, and WellCare and Coventry served the entire Medicaid population. Beginning July 1, 2014, all Medicaid enrollees were permitted to enroll with any of the five plans.

Before the expansion of Medicaid eligibility in Kentucky, the state had given Coventry and WellCare a 7 percent rate increase effective January 1, 2013. In addition, an annual increase scheduled to take effect in October 2013 was accelerated by three months, with a July 1, 2013, effective date. This factor, in addition to the dramatic increases in enrollment and generally more stable claims environment, appears to have had a salutary effect on medical loss ratios. The most recent publicly available medical loss ratio information suggests the plans have made significant progress on fiscal stability (table 10).

TABLE 10

Medical Loss Ratio by Health Plan for 2014

	Anthem	Coventry	Humana	Passport	WellCare
Kentucky	83%	80%	87%	90%	86%
All Medicaid	83%	90%	83%	90%	91%

Sources: Citi Research report (November 5, 2014) and Corporate annual 10-K filings.

Key informants indicated that the administrative procedures used by health plans have also continued to improve since year two. Providers reported that the health plans’ payment and prior authorization processes had improved markedly since the year following implementation of managed care. A provider representative noted that the prior authorization process had become more technology based, instead of relying on mailed or faxed submissions to obtain prior authorization, and that the health plans seemed to be continually streamlining their prior authorization processes. During the third-year key informant interviews, providers indicated they were not yet experiencing substantial administrative difficulties in dealing with three new plans. However, many providers were still

negotiating with the new plans, so it was too early to tell whether new administrative or payment issues would emerge.

Kentucky made a concerted effort in 2014 to modernize its mental health system through the addition of new services and provider types. Reportedly, the ACA provided an impetus for modernization by making additional federal funding available for Medicaid expansion enrollees (with a 100 percent federal match in 2014, 2015, and 2016), adding mental health parity requirements for Medicaid, and making mental health services an essential health benefit. New behavioral and therapeutic health services that have been added under the state's latest State Plan Amendment include supported employment, supported housing, assertive community treatment teams, peer support services, crisis stabilization, speech therapy, private-duty nursing, and new levels and groups within the targeted case management program.

The changes to covered services have been accompanied by a substantial expansion in the number of providers of behavioral health care available to Medicaid beneficiaries (see table 11). In 2013, the cabinet announced that privately practicing psychologists, psychiatrists, and therapists would be permitted to bill the Medicaid program. The addition of art therapists and applied behavioral analysts was pending Centers for Medicare and Medicaid Services' approval at the time of our interviews. A state informant noted that at the time of the interviews in the summer of 2014, over 300 licensed professional clinical counselors and almost 400 licensed clinical social workers had become newly enrolled Medicaid providers. Legislation had been introduced to create behavioral health services organizations that would be similar to the community mental health centers serving Kentucky Medicaid patients at the time of our interviews. On July 15, 2014, emergency regulations (902 KAR 20:430E) were filed to specify the operations and services offered by behavioral health services organizations, and several organizations are operating at the time of this report in this capacity.

The new services were made available at the same time therapeutic rehabilitation programs are closing. About 35 such programs closed between the inception of MMC in Kentucky and our 2014 interviews. The new services are not designed to supplant the therapeutic rehabilitation programs, and health plans continue to not authorize payment for these services. In addition, it is unclear what the impact of the availability of these new behavioral health service organizations combined with the expanded Medicaid population will be on the community mental health centers, which have historically been the sole providers of mental health services for the Medicaid population in Kentucky, or on the population they serve.

TABLE 11

Newly Enrolled Medicaid Providers (calendar year 2012 versus calendar year 2014)

Provider type	Number, 2012	Number, 2014	Change, 2012-14	Percent change, 2012-14
Occupational therapist	16	45	29	181.3%
Psychologist	31	69	38	122.6%
Licensed clinical social worker	44	83	39	88.6%
Physical therapist	133	216	83	62.4%
Licensed professional clinical counselor	0	57	57	NA
Behavioral health multispecialty group	0	48	48	NA
Licensed marriage and family therapist	0	24	24	NA
Speech-language pathologist	0	16	16	NA
Licensed psychological practitioner	0	3	3	NA
Total			337	

Source: Adapted from http://governor.ky.gov/healthierky/Documents/medicaid/Kentucky_Medicaid_Expansion_One-Year_Study_FINAL.pdf.

Case management programs, a core component of managed care, have continued to grow and expand throughout the course of our evaluation. In the third year, providers reported they were playing an increased role in implementation of case management programs. For example, providers are sent lists of patients with high use of the emergency department and asked to follow up with their patients to discourage unnecessary use. Key informants noted continued commitment to curbing ER use. In late 2013, the state announced an initiative called the SMART (Supportive Multidisciplinary Alternatives and Responsible Treatment) program to reduce ER use by “superutilizers” (about 1 percent of patients who are frequent users of the ER). The program is a collaborative effort between the Kentucky Department for Public Health; the Kentucky Department for Medicaid Services; the Kentucky Department for Behavioral Health; the Department for Behavioral Health, Developmental and Intellectual Disabilities; the Kentucky Hospital Association; the Kentucky Health Department Association; and the Kentucky MCOs. The model relies on a team-based care model with a community care coordinator to support all aspects of a patient’s care (behavioral, medical, and dental) in order to address the underlying root causes that negatively affect the patient’s health and result in frequent ER use.³² High-risk pregnancies, which often result in high costs after birth, were another major focus for case management services in year three.

The 2014 Kentucky Behavioral Health Study³³ suggests that psychiatric conditions such as depression and substance abuse and physical comorbidities are driving ER use and recommends expanding the use of case management programs that focus on these conditions. The report

recommends that case management programs grow to encompass foster children, with a particular emphasis on those children who have developed a behavioral health condition. The report also recommends expanding the scope of case management to include review of a patient's treatment plan with providers and family members, particularly for patients on antidepressants or antipsychotics.

The state has also expressed commitment to case management programs by creating a new branch within the Department of Medicaid Services. One responsibility of the new Disease and Case Management Branch will be to review and monitor the plans' disease and case management programs. Furthermore, the state has taken steps to provide the plans with data housed by the Department of Community-Based Services and the Department of Aging and Independent Living pertaining to high-risk individuals.³⁴

Quantitative Study of Changes in Medicaid Spending and Service Use under Managed Care

In this section, we discuss the quantitative results for spending and service use. For each set of outcomes we first describe unadjusted differences in annual averages before (calendar years 2010 and 2011) versus after (calendar year 2013) MMC implementation. These results are reported in tables 2 through 6. Next we report the same differences adjusted for the covariates described in table 7, including age, eligibility category, region, and health status. Equation (1) states this relationship formally. Such controls allow us to better isolate the association between managed care and health care spending and utilization. These results are reported in tables 12 through 16. Finally, we report an additional specification that includes controls for individual fixed effects. These fixed effects control for all time-invariant individual characteristics that are either observed or unobserved in our data, such as race or family medical history, and as a consequence these specifications show changes for the subset of enrollees who were enrolled in both 2010–11 and 2013 rather than the full sample.³⁵ The fixed-effect results are reported in tables 17 through 20.

Changes in Spending

Table 2 shows that unadjusted average annual spending for Medicaid enrollees in the counties transitioned into MMC in the pre-period of 2010 and 2011 was \$2,103 for children and \$5,490 for nonelderly adults. In 2013, after the transition to MMC, unadjusted average annual spending fell to \$1,842 for children (an annual reduction of \$261, or 12 percent) and \$5,329 for nonelderly adults (an annual reduction of \$161, or 3 percent). These reductions could be caused by changes in the extensive margin (whether an enrollee uses any medical care) or the intensive margin (the amount of medical used conditional on using any care). Table 3 suggests that the unadjusted average probability of any medical spending remained relatively constant for both children (97.89 percent in the pre-period and 97.33 percent in the post-period) and nonelderly adults (94.08 percent in the pre-period and 94.44 percent in the post-period) transitioned into MMC. This finding implies that the change in unadjusted average annual spending reported in table 2 is being driven by changes in the intensive margin (i.e., the amount of spending for those with any spending) rather than the extensive margin (i.e., the share with any spending).

Of course, there are other determinants of an enrollee's Medicaid medical spending besides the structure of the Medicaid program. Table 12 suggests that after adjusting for changes in enrollee demographics, eligibility category, region of residence, and indicators of health status over time, average annual spending fell \$482.48 for children (a 23 percent reduction) and \$1,489.90 for nonelderly adults (a 27 percent reduction) after the transition to MMC. That these estimates are larger than the unadjusted estimates in table 2 suggests that failure to adjust for changes in these confounding factors leads to an understatement of the association between MMC and annual health care spending. To be more specific, table 7 suggests that both children and nonelderly adults in the counties transitioned to MMC are more likely to have more comorbidities in the post-period (i.e., they are more likely to have a mental health diagnosis and a higher Charlson score). Having worse health is associated with higher levels of Medicaid spending. For example, children in counties transitioned to MMC with a mental health care diagnosis are predicted to spend an additional \$4,838 per year relative to children without such a diagnosis. Among nonelderly adults, those with a mental health care diagnosis are predicted to spend an additional \$2,221 per year relative to those without such a diagnosis. The regression results in table 12 control for changes in these other confounding factors, but the descriptive results in table 2 do not.

TABLE 12

Estimated Association between Implementation of MMC and Annual Spending per Enrollee

Outcome	Beta	SE	P-value	Sample size
Children new MCO treatment				
Total spending \$	-482.48	26.77	0.000	674,083
Skilled nursing \$	N/A			
Inpatient \$	-127.54	13.23	0.000	674,083
Other \$	-231.58	14.45	0.000	674,083
Outpatient hospital \$	8.40	7.51	0.265	674,083
Office \$	-188.54	24.90	0.000	674,083
Home \$	9.69	3.59	0.008	674,083
Community mental \$	4.16	7.53	0.582	674,083
ER \$	-5.05	0.56	0.000	674,083
Lab \$	-3.26	0.51	0.000	674,083
Transport \$	-0.73	0.18	0.000	674,083
Adult new MCO treatment				
Total spending \$	-1,489.90	66.76	0.000	249,564
Skilled nursing \$	-49.97	12.43	0.000	249,564
Inpatient \$	-591.65	40.89	0.000	249,564
Other \$	-49.22	13.43	0.000	249,564
Outpatient hospital \$	-77.70	34.76	0.027	249,564
Office \$	-457.01	34.97	0.000	249,564
Home \$	-118.26	8.39	0.000	249,564
Community mental \$	0.78	6.84	0.910	249,564
ER \$	-20.58	1.78	0.000	249,564
Lab \$	-90.37	23.07	0.000	249,564
Transport \$	-19.39	2.16	0.000	249,564

Source: 2010, 2011, and 2013 analysis of Kentucky's Medicaid enrollment and claims.

Note: SE = standard error.

Table 17 illustrates that when we include fixed person effects and focus on changes for the group of children and adults who were enrolled in both the 2010–11 and 2013 periods, we find a reduction in average annual spending of \$472.29 (22 percent) for children and \$655.82 (12 percent) for nonelderly adults following the implementation of managed care. This finding suggests that there was a smaller reduction in spending among the subset of nonelderly adults who were enrolled in both the pre- and post-periods than when considering all nonelderly adults in our sample. The spending reduction observed for children was about the same for the subset enrolled in both the pre- and post-periods and for all children in the sample.

Thus, for children in counties transitioned to MMC coverage, our unadjusted estimate of the reduction in Medicaid spending based on all children is \$261 (a 12 percent reduction), our adjusted estimate of this reduction based on all children (i.e., no fixed effects) is \$482.48 (a 23 percent reduction), and our adjusted estimate of this reduction based on the subset of children enrolled in both the pre- and post-reform periods (i.e., with fixed effects) is \$472.20 (22 percent). These results suggest that

controlling for changes in other covariates matters, but restricting attention to the subset of children enrolled in both the pre- and post-reform periods does not. For nonelderly adults in counties transitioned to MMC coverage, our unadjusted estimate of the reduction in Medicaid spending based on all nonelderly adults is \$161 (a 3 percent reduction), our adjusted estimate of this reduction based on all nonelderly adults (i.e., no fixed effects) is \$1,489.90 (a 27 percent reduction), and our adjusted estimate of this reduction based on the subset of nonelderly enrolled in both the pre- and post-reform time periods (i.e., with fixed effects) is \$655.82 (12 percent). These results suggest that for nonelderly adults, controlling for changes in other covariates also matters. In addition, restricting attention to the subset of nonelderly adults enrolled in both the pre- and post-reform time periods leads to a smaller predicted reduction in spending. Of course, some nonelderly adults cycle on and off of Medicaid coverage, so it isn't as though the fixed-effects results are "right" and the non-fixed-effects results are "wrong." Instead, they answer slightly different questions.

We also replicated our spending analysis presented in table 12 on the subset of enrollee-years with a mental health diagnosis. Appendix table D.1 reports these results, as well as those for the subset of enrollee-years without a mental health diagnosis. For both children and nonelderly adults we see a larger predicted reduction in annual spending associated with the mental health diagnosis subsample. For this subsample we see increases in annual community mental health spending, but these increases are not statistically significant. For those without a mental health diagnosis the predicted reduction in annual spending is larger for nonelderly adults than for children, while for those with a mental health diagnosis the predicted reduction in annual spending is larger for children than nonelderly adults.

Regardless of which metric we use, each metric suggests that annual Medicaid spending for enrollees in counties that transitioned into MMC was lower in 2013 than in 2010–11. A natural follow-up is to ask whether spending was reduced on all types of care or if there were reductions in spending on some types of care and increases in others. To answer this question, tables 2, 3, 12, 13, 17, and 18 split total spending into 10 mutually exclusive categories based on the place of service. Two categories of spending we would expect the new MCOs to focus their cost control efforts on are inpatient and ER spending. Tables 13 (no fixed effects) and 18 (with fixed effects) suggest that in counties transitioned to MMC the annual probability of having any inpatient expenditures fell 29 and 60 percent, respectively, for children and 24 and 16 percent, respectively, for nonelderly adults. These tables also suggest that the annual probability of having any ER expenditures fell 7 and 13 percent, respectively, for children and 6 and 4 percent, respectively, for nonelderly adults. Thus, following the transition to managed care, enrollees were less likely to experience these types of expenses over the course of a year. In terms of spending levels, tables 12 (no fixed effects) and 17 (with fixed effects) suggest reductions in annual

inpatient spending of \$127.54 and \$156, respectively, for children in counties transitioned to MMC and a reduction of \$591.65 and \$224.77, respectively, for nonelderly adults.

Table 17 (with fixed effects) suggests that perhaps some of this reduction in inpatient utilization may have been offset by an increase in outpatient hospital utilization. According to the table, children (nonelderly adults) in counties transitioned to MMC had an annual increase in outpatient hospital spending of \$16.79 (\$74.88). On the other hand, our non-fixed-effects regression results in table 12 suggest no statistically significant change in outpatient hospital spending among children in counties transitioned to MMC and a \$77.70 reduction in such spending among nonelderly adults. Taken together, we characterize these results as “slight” evidence of some degree of possible shifting between inpatient and outpatient hospital spending.

In addition to reductions in inpatient and ER spending, relatively large reductions were noted in spending on office visits. Tables 12 (no fixed effects) and 17 (with fixed effects) suggest reductions in annual office spending of \$188.54 and \$173.47, respectively, for children and reductions of \$457.01 and \$366.49, respectively, for nonelderly adults in counties transitioned to MMC. In addition, the general category of “other” spending appears to have been used less frequently and to account for fewer dollars after MMC implementation. For example, table 12 (no fixed effects) suggests that “other” annual spending fell \$231.58 among children in counties transitioned to MMC and fell \$49.22 among nonelderly adults. Among children in counties transitioned to MMC, we do not observe large changes in spending within the remaining categories of home, lab, transportation, or community health spending. Among nonelderly adults in those counties, we do see larger reductions in home spending (a reduction of \$118.26) and lab spending (a reduction of between \$90.37) in our non-fixed-effect model estimates presented in table 12.

Taken as a whole, the unadjusted spending results reported in table 2 and the adjusted spending results reported in tables 12, 13, 17, and 18 consistently suggest that the implementation of MMC was associated with decreases across several major spending categories, including inpatient, ER, and office spending. The magnitude of these reductions depends in part on whether we adjust for other observed factors that influence medical care spending and whether we restrict attention to the subset of enrollees that participated in Medicaid in both the pre- and post-period. One category of spending in which we see increases is community mental health spending, but these annual increases (\$4.16 for children and 78 cents for adults) are not statistically significant in our non-fixed-effects specification (table 12). Our fixed-effects specification (table 17) suggests an annual increase in community mental health spending of \$25.23 for children and \$3.18 for adults in counties transitioning to MMC. As mentioned above, we also see slight evidence of an increase in outpatient hospital spending. We should

note here that we do not adjust for any changes in inflation, so our spending results should be interpreted as changes in nominal spending. Assuming a positive rate of health care spending inflation would imply our results understate inflation-adjusted changes in spending.

TABLE 13

Estimated Association between Implementation of MMC and Prevalence of Annual Spending

Outcome	Beta	SE	P-value	Sample size	Mean	Marginal effect
Children new MCO treatment						
Any spending \$	-0.007	0.001	0.000	674,083	97.68%	-1%
Any skilled nursing \$	N/A					
Any inpatient \$	-0.015	0.002	0.000	674,083	5.09%	-29%
Any other \$	-0.470	0.026	0.000	674,083	40.13%	-117%
Any outpatient hospital \$	-0.010	0.004	0.012	674,083	53.82%	-2%
Any office \$	-0.023	0.006	0.000	674,083	92.45%	-2%
Any home \$	-0.023	0.003	0.000	674,083	8.65%	-27%
Any community mental \$	0.012	0.004	0.007	674,083	8.10%	15%
Any ER \$	-0.027	0.004	0.000	674,083	38.93%	-7%
Any lab \$	-0.009	0.005	0.092	674,083	15.12%	-6%
Any transport \$	-0.003	0.001	0.000	674,083	1.02%	-25%
Adult new MCO treatment						
Any spending	-0.008	0.001	0.000	249,564	94.20%	-1%
Any skilled nursing \$	-0.002	0.0003	0.000	249,564	0.33%	-50%
Any inpatient \$	-0.047	0.003	0.000	249,564	19.70%	-24%
Any other \$	-0.156	0.012	0.000	249,564	15.12%	-103%
Any outpatient hospital \$	-0.020	0.003	0.000	249,564	75.27%	-3%
Any office \$	-0.031	0.004	0.000	249,564	88.31%	-3%
Any home \$	-0.063	0.003	0.000	249,564	21.34%	-29%
Any community mental \$	0.011	0.005	0.035	249,564	10.96%	10%
Any ER \$	-0.032	0.003	0.000	249,564	50.96%	-6%
Any lab \$	0.002	0.009	0.826	249,564	49.06%	0.4%
Any transport \$	-0.011	0.002	0.000	249,564	6.90%	-17%

Source: 2010, 2011, and 2013 analysis of Kentucky's Medicaid enrollment and claims.

Changes in Utilization

We now turn to our analysis of changes in the use of particular types of services that fall within these spending categories, including an evaluation of the relationship between the implementation of MMC and the number of preventive, dental, and early and periodic screening, diagnosis, and treatment (EPSDT) visits received. The EPSDT benefit provides comprehensive and preventive health care services for children under age 21 who are enrolled in Medicaid. EPSDT ensures that children and adolescents receive appropriate preventive, dental, mental health, and developmental, and specialty services. States are required to provide comprehensive services and furnish all Medicaid recipients appropriate and medically necessary services needed to correct health conditions. CMS provides specific instructions to states and providers on how to report screenings, but the process is sometimes complicated due to varying billing systems. We note that the Kentucky external quality review organization, IPRO, reported problems with the Kentucky MCOs submitting incorrectly formatted EPSDT information to Kentucky Medicaid, which may cause some underreporting of actual utilization.

Tables 15 (no fixed effects) and 20 (with fixed effects) suggests that for children in counties transitioned to MMC there was a 3 and 33 percent reduction, respectively, in the probability of having any annual preventive visits and a 5 and 36 percent reduction, respectively, in the probability of having any paid EPSDT visits. The larger (33 and 36 percent) of these estimated reductions among children was produced by the subsample enrolled in both the pre- and post-reform time periods. Since our results indicate a large reduction in the provision of preventive and paid EPSDT services, we performed a number of validity checks and comparisons to other data sources. First, we reviewed the EPSDT use rates reported on the CMS website.³⁶ Reviewing the total screenings for Kentucky reported by CMS, we find that from 2009 to 2014, the CMS data shows no consistent pattern with respect to EPSDT screening rates in Kentucky. Appendix E provides further discussion. Next, we performed additional data validation exercises with the Kentucky Cabinet for Health and Family Services to confirm our data extracts match CHFS claim counts and totals. The issue with Kentucky MCO data submissions identified by IPRO may be a contributing factor to our data differences, and may offer an explanation for the large service use declines. In contrast to the results for children, we find that nonelderly adults in counties transitioned to MMC experienced a 9 and 7 percent increase, respectively, in the probability of having any preventive visits.

Changes in the likelihood of receiving any annual dental services are also of interest. Among children in counties transitioned to MMC, table 15 (no fixed effects) suggests a 2 percent increase in the probability of having at least one annual dental visit, and table 20 (with fixed effects) suggests that this increase is 13 percent. Conversely, for nonelderly adults in these counties table 15 suggests a 3 percent

reduction and table 20 suggests a 10 percent reduction in the probability of having at least one annual dental visit.

Appendix table D.2 examines changes in utilization for the subset of enrollee-years associated with a mental health diagnosis. We see larger reductions in the number of annual avoidable ER visits for both children and nonelderly adults in the mental health subsample as compared to those without a mental health diagnosis. We see similar reductions in avoidable hospitalizations and hospital readmissions among nonelderly adults in both subsamples. Among children, we see smaller reductions in the number of preventive office visits and paid EPSDT visits for those with a mental health diagnosis. These results suggest that enrollees with a mental health diagnosis were not receiving fewer services. On the other hand, we do see larger reductions in inpatient and dental utilization among those with a mental health diagnosis. It is difficult to draw a definitive conclusion about the extent to which managed care was able to successfully integrate physical and behavioral health care services based on these results.

Changes in Quality of Care

Although we do not have access to objective measures of health that would be available on a patient's chart, such as cholesterol level or body mass index, we can infer some aspects of quality of care received by enrollees from Medicaid claims data. The first measure of quality of care we considered is the likelihood that a nonelderly adult enrollee had an avoidable hospitalization. As discussed in the data section of this report, this measure is a proxy for the quality of primary care because these types of hospitalizations would typically be avoided if the patient is receiving high-quality primary care. Thus an increase in this measure would raise a red flag about primary care access or quality. Table 15 (no fixed effects) suggests that among nonelderly adults in counties transitioned to MMC there was a 49 percent reduction in the probability of having any annual avoidable hospitalizations, but table 20 (with fixed effects) suggests that this reduction was 14 percent.

A second quality measure related to hospital care is the likelihood that a Medicaid enrollee discharged from the hospital is subsequently readmitted. We considered different windows of time (7, 30, and 90 days) to define a new hospitalization following a previous one as a "readmission." Table 15 (no fixed effects) suggests that the probability of having at least one 7-day or less annual readmission to a hospital fell 41 percent among children and 54 percent among nonelderly adults in counties transitioned to MMC. Table 20 (with fixed effects) reports reductions of 50 percent among children and 25 percent among nonelderly adults for this same measure. There is consistent evidence in both our

non-fixed-effects (tables 14 and 15) and our fixed-effects (tables 19 and 20) models that readmissions fell after the implementation of MMC.

TABLE 14

Estimated Association between Implementation of MMC and Annual Utilization (ordinary least squares model – includes 0 and non-0 utilization years)

Outcome	Beta	SE	P-value	Sample size
Children new MCO treatment				
# Inpatient	-0.031	0.002	0.000	674,083
# Avoidable inpatient	N/A			
# 7-day readmits	-0.006	0.001	0.000	63,201
# 30-day readmits	-0.007	0.002	0.000	63,201
# 90-day readmits	-0.011	0.002	0.000	63,201
# ER	-0.074	0.009	0.000	674,083
# Avoidable ER	-0.051	0.008	0.000	674,083
# Outpatient	-0.943	0.130	0.000	674,083
# Preventive visits	-0.062	0.014	0.000	674,083
# EPSDT visits	-0.077	0.015	0.000	674,083
# Dental visits	-0.034	0.011	0.004	674,083
Adult new MCO treatment				
# Inpatient	-0.104	0.006	0.000	249,564
# Avoidable inpatient	-0.021	0.002	0.000	249,564
# 7-day readmits	-0.021	0.002	0.000	84,294
# 30-day readmits	-0.049	0.005	0.000	84,294
# 90-day readmits	-0.048	0.004	0.000	84,294
# ER	-0.261	0.020	0.000	249,564
# Avoidable ER	-0.170	0.014	0.000	249,564
# Outpatient	0.213	0.073	0.004	249,564
# Preventive visits	0.005	0.006	0.381	249,564
# EPSDT visits	N/A			
# Dental visits	-0.054	0.008	0.000	249,564

Source: 2010, 2011, and 2013 analysis of Kentucky’s Medicaid enrollment and claims.

TABLE 15

Estimated Association between Implementation of MMC and Annual Utilization Prevalence (linear probability models)

Outcome	Beta	SE	P-value	Sample size	Mean	Marginal effect
Children new MCO treatment						
Any inpatient	-0.014	0.001	0.000	674,083	3.95%	-35%
Any avoidable inpatient	N/A					
Any 7-day readmits	-0.004	0.001	0.000	63,201	0.98%	-41%
Any 30-day readmits	-0.004	0.001	0.000	63,201	1.93%	-23%
Any 90-day readmits	-0.010	0.002	0.000	63,201	3.01%	-34%
Any ER	-0.030	0.003	0.000	674,083	39.31%	-8%
Any avoidable ER	-0.023	0.003	0.000	674,083	26.85%	-9%
Any outpatient	-0.037	0.003	0.000	674,083	87.42%	-4%
Any preventive care	-0.013	0.006	0.041	674,083	44.65%	-3%
Any EPSDT visits	-0.022	0.007	0.002	674,083	43.85%	-5%
Any dental visits	0.010	0.004	0.008	674,083	58.46%	2%
Adult new MCO treatment						
Any inpatient	-0.046	0.002	0.000	249,564	16.30%	-28%
Any avoidable inpatient	-0.013	0.001	0.000	249,564	2.74%	-49%
Any 7-day readmits	-0.014	0.001	0.000	84,294	2.56%	-54%
Any 30-day readmits	-0.023	0.002	0.000	84,294	5.01%	-47%
Any 90-day readmits	-0.030	0.002	0.000	84,294	6.27%	-48%
Any ER	-0.038	0.003	0.000	249,564	49.02%	-8%
Any avoidable ER	-0.036	0.003	0.000	249,564	36.32%	-10%
Any outpatient	-0.011	0.002	0.000	249,564	86.83%	-1%
Any preventive care	0.011	0.003	0.000	249,564	11.98%	9%
Any EPSDT visits	N/A					
Any dental visits	-0.009	0.003	0.007	249,564	29.18%	-3%

Source: 2010, 2011, and 2013 analysis of Kentucky's Medicaid enrollment and claims.

Our final quality measure for physical health examines changes in avoidable ER visits. As with our avoidable hospitalization measure, we were interested in looking at changes in ER visits that are classified as nonurgent and primary care treatable. Tables 15 and 20 illustrate that for children in counties transitioned to MMC, the probability of having any annual avoidable ER visits fell 9 and 20 percent, respectively. For nonelderly adults, the declines were 10 and 9 percent, respectively. These results suggest that enrollees in counties transitioned to MMC were less likely to receive ER care for nonurgent and primary care-treatable health issues in the postperiod.

TABLE 16

Estimated Association between Implementation of MMC and Annual Mental Health Care Utilization Prevalence (linear probability models)

Mental Health Services Utilization (= 1 for any utilization of this type)	Beta	SE	P-value	Sample size	Mean	Marginal effect
Children new MCO treatment						
Antipsychotic complaint	-0.1924	0.0098	0.000	15,095	33.23%	-58%
Any targeted case management	0.0130	0.0039	0.001	53,320	5.42%	24%
Any crisis stabilization services	0.0014	0.0012	0.263	53,320	0.84%	16%
Any rehabilitation services	0.0001	0.0005	0.766	53,320	0.13%	11%
Prompt mental health discharge follow-up	-0.0079	0.0107	0.460	5,568	17.91%	-4%
Adult new MCO treatment						
Antipsychotic complaint	-0.2292	0.0117	0.000	24,411	32.75%	-70%
Any targeted case management	0.0066	0.0026	0.011	98,544	3.72%	18%
Any crisis stabilization services	0.0010	0.0005	0.048	98,544	0.30%	32%
Any rehabilitation services	-0.0005	0.0002	0.002	98,544	0.09%	-61%
Prompt mental health discharge follow-up	-0.0903	0.0186	0.000	4,018	36.86%	-25%

Source: 2010, 2011, and 2013 analysis of Kentucky's Medicaid enrollment and claims.

TABLE 17

Estimated Association between Implementation of MMC and Annual Spending by Category with Individual Fixed Effects (ordinary least squares model – includes 0 and non-0 spending years)

Outcome	Beta	SE	P-value	Sample size
Children new MCO treatment				
Total spending \$	-472.29	35.20	0.000	674,083
Skilled nursing \$	N/A			
Inpatient \$	-156.00	14.34	0.000	674,083
Other \$	-225.79	14.13	0.000	674,083
Outpatient hospital \$	16.79	6.60	0.012	674,083
Office \$	-173.47	27.71	0.000	674,083
Home \$	-5.20	4.01	0.197	674,083
Community mental \$	25.23	7.45	0.001	674,083
ER \$	-8.62	0.54	0.000	674,083
Lab \$	1.21	0.46	0.010	674,083
Transport \$	-0.72	0.16	0.000	674,083
Adult new MCO treatment				
Total spending \$	-655.82	72.22	0.000	249,564
Skilled nursing \$	28.38	5.66	0.000	249,564
Inpatient \$	-224.77	44.98	0.000	249,564
Other \$	-22.52	10.45	0.033	249,564
Outpatient hospital \$	74.88	33.58	0.028	249,564
Office \$	-366.49	23.66	0.000	249,564
Home \$	-21.78	6.15	0.001	249,564
Community mental \$	3.18	7.81	0.685	249,564
ER \$	-8.70	1.59	0.000	249,564
Lab \$	-111.99	27.67	0.000	249,564
Transport \$	-8.20	2.39	0.001	249,564

Source: 2010, 2011, and 2013 analysis of Kentucky's Medicaid enrollment and claims.

Changes in Behavioral Health Service Utilization and Quality

Another goal of our work is to better understand the relationship between the implementation of MMC and the use of behavioral health services. Our previous analysis of Medicaid spending suggested that MMC was correlated with increases in community mental health spending in some specifications. We extended this analysis by evaluating changes over time in the receipt of a prompt outpatient follow up after being discharged from a mental health hospitalization, and, for those with a mental health diagnosis, the probability of having any annual targeted case management services, any crisis stabilization services, and any rehabilitation services.

Table 6 reports utilization measures for behavioral health for the adult and child samples. Table 6 illustrates that around 40 percent of the discharges from inpatient mental health hospitals in the pre-period among non-elderly adults had a prompt outpatient follow up. For children, the pre-period measure was about 18 percent with prompt outpatient follow up. In the post-period, the adult measure drops to 34 percent of discharges receiving prompt follow up, while the child measure remains about 18 percent receiving prompt outpatient follow up. Comparing both adult and child measures to those in Region Three (appendix table C.5), we see that these measures within Region Three remain unchanged, while the new MCO regions show a decline in prompt follow up for the nonelderly adult population. After adjusting for other covariates, table 16 reports that receipt of a prompt follow up fell by 25 percent among nonelderly adults in these counties. We did a similar analysis for children, though for them, the discharge would be from an acute care hospital psychiatric unit rather than a standalone mental health hospital. Our results for children in counties transitioned to MMC suggest that there was no statistically significant change in the probability they had a prompt follow up after such a discharge.

For both crisis stabilization and rehabilitation services, we see that the probability of having any annual services of either type is below 1 percent for both non-elderly adults and children for the pre-period, with both measures showing slight increases during the post-period. The targeted case management measure shows the probability of any annual service for adults is about 3.46 percent in the pre-period, while the probability of any annual service for children is about 4.75 percent in the pre-period. In the post-period, the probability for targeted case management increases for adults by about 1 percentage point (from 3.46 to 4.26 percent), and increases for children by about 2 percentage points (from 4.75 to 6.84 percent). After adjusting for other covariates, Table 16 shows no statistically significant change in the probability of having any annual crisis stabilization services in counties that transitioned to MMC for either children or nonelderly adults. There is also no statistically significant change in the probability of having any annual rehabilitation services among children, but a 61 percent

reduction in this annual probability for nonelderly adults. Given the small number of recipients utilizing these services, the magnitude of the reduction may not reflect a meaningful difference.

Thus, in terms of behavioral health, our results are mixed. We find that Medicaid managed care is associated with increases in the likelihood of having any targeted case management services among those with a mental health diagnosis, but we also find reductions in the likelihood of having a prompt outpatient follow-up for nonelderly adults discharged from a mental health hospital.

TABLE 18
Estimated Association between Implementation of MMC and Annual Spending Prevalence by Category with Individual Fixed Effects (linear probability models)

Outcome	Beta	SE	P-value	Sample size	Mean	Marginal effect
Children new MCO treatment						
Any spending \$	-0.008	0.001	0.000	674,083	97.68%	-1%
Any skilled nursing \$	N/A					
Any inpatient \$	-0.031	0.002	0.000	674,083	5.09%	-60%
Any other \$	-0.499	0.026	0.000	674,083	40.13%	-124%
Any outpatient hospital \$	-0.028	0.004	0.000	674,083	53.82%	-5%
Any office \$	-0.018	0.005	0.000	674,083	92.45%	-2%
Any home \$	-0.043	0.003	0.000	674,083	8.65%	-50%
Any community mental \$	0.029	0.004	0.000	674,083	8.10%	36%
Any ER \$	-0.051	0.004	0.000	674,083	38.93%	-13%
Any lab \$	-0.020	0.007	0.005	674,083	15.12%	-13%
Any transport \$	-0.003	0.001	0.000	674,083	1.02%	-32%
Adult new MCO treatment						
Any spending\$	-0.0014	0.001	0.174	249,564	94.20%	-0.15%
Any skilled nursing \$	0.001	0.0003	0.001	249,564	0.33%	35%
Any inpatient \$	-0.031	0.003	0.000	249,564	19.70%	-16%
Any other \$	-0.143	0.012	0.000	249,564	15.12%	-95%
Any outpatient hospital \$	-0.003	0.004	0.387	249,564	75.27%	-0.4%
Any office \$	-0.022	0.004	0.000	249,564	88.31%	-2%
Any home \$	-0.015	0.003	0.000	249,564	21.34%	-7%
Any community mental \$	0.011	0.005	0.041	249,564	10.96%	10%
Any ER \$	-0.021	0.003	0.000	249,564	50.96%	-4%
Any lab \$	0.012	0.008	0.162	249,564	49.06%	2%
Any transport \$	-0.003	0.002	0.076	249,564	6.90%	-5%

Source: 2010, 2011, and 2013 analysis of Kentucky's Medicaid enrollment and claims.

TABLE 19

Estimated Association between Implementation of MMC and Annual Utilization with Individual Fixed Effects (ordinary least squares model – includes 0 and non-0 utilization years)

Outcome	Beta	SE	P-value	Sample size
Children new MCO treatment				
# Inpatient	-0.044	0.002	0.000	674,083
# Avoidable inpatient	N/A			
# 7-day readmits	-0.006	0.001	0.000	63,201
# 30-day readmits	-0.014	0.002	0.000	63,201
# 90-day readmits	-0.027	0.003	0.000	63,201
# ER	-0.167	0.009	0.000	674,083
# Avoidable ER	-0.122	0.008	0.000	674,083
# Outpatient	-0.727	0.122	0.000	674,083
# Preventive visits	-0.460	0.016	0.000	674,083
# EPSDT visits	-0.476	0.017	0.000	674,083
# Dental visits	0.154	0.014	0.000	674,083
Adult new MCO treatment				
# Inpatient	-0.059	0.005	0.000	249,564
# Avoidable inpatient	-0.006	0.002	0.001	249,564
# 7-day readmits	-0.008	0.002	0.001	84,294
# 30-day readmits	0.017	0.004	0.000	84,294
# 90-day readmits	-0.021	0.004	0.000	84,294
# ER	-0.197	0.017	0.000	249,564
# Avoidable ER	-0.136	0.012	0.000	249,564
# Outpatient	0.659	0.071	0.000	249,564
# Preventive visits	0.003	0.005	0.610	249,564
# EPSDT visits	N/A			
# Dental visits	-0.112	0.009	0.000	249,564

Source: 2010, 2011, and 2013 analysis of Kentucky's Medicaid enrollment and claims.

TABLE 20

Estimated Association between Implementation of MMC and Annual Utilization Prevalence with Individual Fixed Effects (linear probability models)

Outcome	Beta	SE	P-value	Sample size	Mean	Marginal effect
Children new MCO treatment						
Any inpatient	-0.027	0.002	0.000	674,083	3.95%	-69%
Any avoidable inpatient	N/A					
Any 7-day readmits	-0.005	0.001	0.000	63,201	0.98%	-50%
Any 30-day readmits	-0.011	0.001	0.000	63,201	1.93%	-56%
Any 90-day readmits	-0.024	0.002	0.000	63,201	3.01%	-81%
Any ER	-0.056	0.003	0.000	674,083	39.31%	-14%
Any avoidable ER	-0.053	0.003	0.000	674,083	26.85%	-20%
Any outpatient	-0.036	0.003	0.000	674,083	87.42%	-4%
Any preventive care	-0.146	0.007	0.000	674,083	44.65%	-33%
Any EPSDT visits	-0.159	0.007	0.000	674,083	43.85%	-36%
Any dental visits	0.074	0.005	0.000	674,083	58.46%	13%
Adult new MCO treatment						
Any inpatient	-0.032	0.002	0.000	249,564	16.30%	-20%
Any avoidable inpatient	-0.004	0.001	0.001	249,564	2.74%	-14%
Any 7-day readmits	-0.006	0.001	0.000	84,294	2.56%	-25%
Any 30-day readmits	-0.008	0.002	0.000	84,294	5.01%	-15%
Any 90-day readmits	-0.015	0.002	0.000	84,294	6.27%	-23%
Any ER	-0.033	0.003	0.000	249,564	49.02%	-7%
Any avoidable ER	-0.032	0.003	0.000	249,564	36.32%	-9%
Any outpatient	0.005	0.002	0.031	249,564	86.83%	1%
Any preventive care	0.008	0.003	0.011	249,564	11.98%	7%
Any EPSDT visits	N/A					
Any dental visits	-0.030	0.003	0.000	249,564	29.18%	-10%

Source: 2010, 2011, and 2013 analysis of Kentucky's Medicaid enrollment and claims.

Sensitivity Analysis

The quantitative results reported above were subject to various sensitivity analyses to assess the robustness of our results. In general, our findings are robust to each of these sensitivity checks, which suggests they are not simply an artifact of our modeling assumptions or choice of sample.

First, we assessed the extent to which our findings changed when we defined the postperiod to consist of calendar years 2012 and 2013, rather than just 2013. Although adding 2012 data led to changes in the magnitude of some of our findings, we retained our basic conclusion that MMC was associated with reductions in service use and spending. As mentioned, we dropped 2012 so our results would not be biased by the implementation issues surrounding the initial rollout of MMC in Kentucky. In previous work for the Foundation (prior to our receipt of the second wave of data from the cabinet), we

considered a postperiod that consisted of 2012 only. Our findings from that analysis also suggested reductions in service use and spending. Each of these sets of findings is available upon request.

Second, we assessed the extent to which our findings changed when we used more sophisticated nonlinear econometric models rather than the more standard ordinary least squares model. For example, we estimated our spending and count models presented in tables 12, 14, 17, and 19 as Poisson models. In addition, we also attempted to isolate changes along the intensive margin by reestimating the models presented in these tables on the subsamples of enrollee-years that represented positive spending or utilization in the given category. Again, our basic conclusions were unaffected by these changes. These findings are also available upon request.

Third, we replicated all our analysis on the children and nonelderly adult Medicaid enrollees fitting our sample requirements that resided in Region 3. At first glance, these enrollees could arguably serve as a control group to compare against those enrollees across the rest of the state transitioning from fee-for-service Medicaid into MMC, because enrollees within Region 3 were always in some form of MMC. Although their managed care status should remain unchanged, they should be equally affected by any state-specific trends in the health care market as enrollees outside of Region 3. In practice, however, the introduction of new MCOs into Region 3 in 2013 essentially invalidated this approach. We report our Region 3 results in appendix C. These results suggest that children and nonelderly adult Medicaid enrollees within Region 3 also experienced reductions in spending in 2013 as compared to 2010–11.

Discussion of Findings

In this report, we describe the relationship between the implementation of MMC and various categories of physical and mental health care spending and use for both children and nonelderly adult Medicaid enrollees in the counties outside of Region 3 that were transitioned into managed care. We compare values for these different measures in 2010–11 with their 2013 values both for all enrollees and for the subset that was enrolled in both the pre- and postperiods. We consider the effect on spending and utilization counts, which combine the intensive margin (did the enrollee get any services?) and the extensive margin (if, so how many?), as well as focusing on the intensive margin only.

Taken together, these results suggest that the implementation of managed care led to reductions in Medicaid spending and service use. Although the direction of the change is uniform across almost all categories of service, the estimated magnitude depends on the type of service, the population being considered (i.e., adults versus children or all enrollees versus the subset enrolled in both the pre- and

post-periods), and whether we adjust for other covariates that we would expect to be correlated with health care consumption. The findings suggest that the implementation of MMC generated savings to the state in the form of lower Medicaid spending.

In some cases, it was anticipated that MCOs would be able to use their expertise to reduce use and spending relative to what prevailed under fee-for-service. For example, reductions in inpatient and ER spending, along with some evidence of increases in outpatient hospital and community mental health center spending, are consistent with managed care shifting care to lower-cost clinical settings when appropriate. This concept is also supported by the increase in preventive care observed among nonelderly adults, as well as the observed reductions in avoidable hospitalizations, ER visits, and hospital readmissions. In contrast, the observed reductions in preventive visits and mixed results with respect to EPSDT visits for children were surprising and run counter to the theoretical predictions typically associated with managed care.

Our overall assessment for the behavioral health specific measures finds that the MCO population did not report any large significant changes in service use or spending. The overall spending for CMHC services is up slightly, the targeted case management measure is up slightly, and the crisis stabilization and rehabilitation services remain roughly the same, or slightly lower. The prompt follow up after a mental health hospital discharge is slightly lower for adults, and roughly the same for children.³⁷

Our observations of almost across-the-board reductions in use raise concerns about the quality of the data. We considered a few competing explanations for our results. First, we conferred with the Kentucky Cabinet of Health and Family Services to ensure that the reductions we observed were not caused by an incomplete data pull. As discussed above, the cabinet confirmed that the data that formed the basis of our analysis matched their data. Second, it is possible that the cabinet's data somehow undercount the true provision of care by the new MCOs. Without access to the MCOs' data, we cannot directly test this possibility. It seems less likely that this sort of underreporting is occurring for big-ticket items such as inpatient stays as compared to outpatient measures like preventive care visits. As also discussed above, we attempted to validate our measures with external data sources when possible. We did not find any compelling evidence of underreporting, but we cannot definitively rule out that possibility. In addition, as indicated above, we cannot rule out the possibility that other factors, besides managed care are driving changes we observe given that our analysis relies on a pre-post analysis of change within the new managed care regions. However, we did not identify any other major policy or health system changes that could account for these patterns.

If we assume our estimated reductions represent true reductions in use, a natural follow-up question is whether these reductions have adverse effects on health outcomes. This question is very difficult to answer with the data we have at our disposal. Our indirect attempts to evaluate quality of care centered around forms of service utilization we would expect to observe if there were reductions in physical health care quality and enrollee health status, such as avoidable inpatient stays and ER visits, as well as hospital readmissions. These measures all suggested increases in quality, as all of them decreased after the implementation of MMC. We found mixed results for the quality measures related to behavioral health, with positive findings with respect to receipt of targeted case management services but reductions in extent of prompt follow up following a mental health hospital discharge for adults. As mentioned above, without objective measures of enrollee health status it is not possible to answer this question definitively. In addition, a one- or two-year time horizon may be insufficient to evaluate the association between MMC and health outcomes, even if we had such objective measures of health.

Conclusions

This is the final report prepared during a three-year evaluation of the statewide implementation of risk-based managed care in seven of Kentucky's eight Medicaid regions. The evaluation was designed to assess the short-term effects of risk-based managed care implementation on the major partners (beneficiaries, providers, plans, and the state) and gain an understanding of the basic effects on the provision of care.

The report synthesizes the key findings from the qualitative and quantitative analyses conducted under the evaluation. The qualitative analysis highlights implementation issues and beneficiary perspectives identified and discussed in our year one and year two reports. This analysis is based on stakeholder interviews, document review, and information obtained in 10 focus groups. The quantitative component, which is based on claims and encounter data provided by the Kentucky Cabinet for Health and Family Services, assesses how service use and spending patterns changed between 2010 and 2013 for the Medicaid enrollees living in the counties that moved from fee-for-service to capitated managed care.

Our first-year implementation assessment noted significant problems associated with the rollout of managed care in 2011, including financial difficulties for plans and increased administrative and financial burdens on providers, as well as lack of adequate mechanisms in state government to effectively oversee managed care plans. By the second year of MMC in Kentucky, many of these issues had been resolved. The plans were stronger financially, and they had implemented case management programs to control costs. The cabinet had greatly increased its oversight of the managed care plans and had taken steps to facilitate greater collaboration and communication among key stakeholders.

In the third year of managed care implementation, other major policy changes were introduced in Kentucky. New managed care plans began providing services to Medicaid enrollees, and on January 1, 2014, Kentucky expanded its Medicaid program under the ACA, which led to a substantial increase in Medicaid enrollment. Subsequently, additional federal funds were allocated to federally qualified health centers; Medicaid reimbursement for primary care was increased; and the state implemented major policy changes aimed at expanding the supply of behavioral health services. Our assessment of the third year of managed care implementation found positive changes and some concerns. There was continued improvement in health plan administrative processes. Both the behavioral health services available to Medicaid enrollees and the types of providers available to offer behavioral health services were

expanded. Concerns continued about the ability of the Medicaid delivery system to meet the health needs of the newly enrolled population.

Using Medicaid administrative claims and enrollment data from 2010–13, we examined changes in service use and spending patterns following the adoption of managed care. Overall, we found that the implementation of managed care was associated with reductions in Medicaid spending and service use, with a uniform direction of change across almost all categories of service. These findings suggest that the implementation of MMC generated savings to the state in the form of lower Medicaid spending on health care services for adults and children covered under Medicaid for a full year or more.

Given that the new managed care organizations were introduced in November 2011, our estimates should be viewed as evidence of relatively early, short-run changes. An important limitation on our analyses is the completeness of the encounter data generated by the managed care organizations: the state’s external quality review organization identified several areas for which data were incomplete, so the actual rate of service provision may be greater than documented by the encounter data. In addition, though we did not identify any major policy or health system change that could account for these patterns, we cannot rule out the possibility that other factors, besides managed care, are driving the spending and service use reductions because our study design did not utilize a randomized experiment.

There were reductions in inpatient hospital care, along with some evidence of increases in outpatient hospital and community mental health center spending. These changes are consistent with managed care shifting care to lower-cost clinical settings. Increases in preventive care were observed among nonelderly adults, as well as reductions in avoidable hospitalizations, ER visits, and hospital readmissions. In contrast, the mixed results with respect to EPSDT visits for children were surprising and run counter to the theoretical predictions typically associated with managed care. Finally, we found that MMC is associated with increases in the likelihood of having any targeted case management services among those with a mental health diagnosis, but we also found reductions in the likelihood of having a prompt outpatient follow-up for nonelderly adults discharged from a mental health hospital and larger overall reductions in annual spending for those with a mental health diagnosis.

Moving forward, these results suggest the need for continued monitoring of enrollee utilization to definitively determine if the reductions we observed in the data represent true reductions in medical care consumption or if they are being driven by data management issues. Ongoing monitoring is especially important for services in which reductions or mixed results raise potential concerns about quality of care, such as preventive care and EPSDT visits for children, and outpatient follow-up for adults discharged from a mental health hospital. It will also be important for future analysis to consider

and evaluate objective measures of enrollee health (e.g., infant mortality) to assess how these outcomes are changing.³⁸ Taken altogether, the evidence suggests a need for systematic real-time monitoring of the care Medicaid enrollees receive under managed care along with an assessment of contractual and other policy changes that would lead to improved outcomes for the growing population served by MMC organizations in the state.

Appendix A. Key Informants

Table A.1 includes all key informants interviewed during the three years of the evaluation.

TABLE A.1

Key Informants

Informant type	Name	Organization	Title	Years Interviewed		
				1	2	3
State official	Julie Denton	KY Legislature	State Senator	X	X	
	Adam Edelen		State Auditor	X	X	
	Lawrence Kissner	Cabinet for Health and Family Services	Medicaid Commissioner		X	X
	Lisa Lee	Cabinet for Health and Family Services	State Director of Provider Operations	X	X	X
Health plan executive	Russell Harper	Coventry	Director of Government Relations	X	X	X
	Michael Murphy		Chief Executive Officer	X	X	
	Spencer Boyer		VP of Network Development	X		
	Carol Muldoon		VP of Operations	X		
	Helen Homberger	Kentucky Spirit	VP of Medical Management		X	
	Jean Rush		Chief Executive Officer	X	X	
	Kelly Munson	WellCare	Chief Operating Officer		X	
	Dora Wilson		Former Chief Operating Officer	X		
	Cheryl Schafer		Senior Medical Director	X		
	Pat Russell		Director of Operations		X	
	Dr. Florence Shafiq		Medical Director		X	
	Rhonda Warner		Director of Quality		X	
	Mark Carter	Passport Health	Chief Executive Officer	X		X
	Jill Bell		Vice President and Chief Executive Officer	X		X
Dr. Steve Hoglan	Chief Medical Officer				X	
Provider representative	Rick King	Appalachian Regional Healthcare	Chief Legal Officer	X	X	
	Bob McFalls	Kentucky Pharmacists Association	Executive Director/ Chief Executive Officer		X	
	Annie Williams	Hazard Clinic	Practice Administrator	X	X	X
	Stephanie Wooton		Practice Administrator	X	X	X

Informant type	Name	Organization	Title	Years Interviewed		
				1	2	3
	Steve Shannon	KARP	Executive Director	X	X	X
	Lindy Lady	Kentucky Medical Association	Medical Practice Advocacy Manager	X	X	X
	Patrick Padgett		Executive Vice President	X		
	Peggy Halcomb	KY Medical Services Foundation	Director of Business Operations	X	X	
	Linda Sims	Lincoln Trail Health Department	Former Director		X	
	Dr. Donald Neel	Pediatrician (Private Practice)	Pediatrician	X	X	X
	Judy Hayden		Administrator	X		
	Matt Adams	Danville Medical Specialists	Administrator	X		
	Chris Keyser	Fairview Community Health Center	Executive Director	X		
	Michael Porter	Kentucky Dental Association	Executive Director	X		
	Bert Whitaker	Trover Health System	Chief Executive Officer	X		
	Robert Brooks		Vice President of the Education and Research Foundation	X		
	Randall Power		Vice President of Clinic Operations	X		
	Ed Erdway	University of Kentucky	Chief Revenue Officer	X		
	Mark Birdwhistell		Associate Vice President for Marketing and External Affairs and Chief of Staff	X		
	Stephanie Moore	White House Clinics	Chief Executive Officer	X		
	Steve Miller	Kentucky Hospital Association	Vice President of Finance	X		
	Nancy Galvagni		Senior Vice President	X		
	Patrick Padgett	Kentucky Medical Association	Executive Vice President	X		
	Susan Starling	Marcum and Wallace Hospital	Chief Executive Officer	X		
	Della Deerfield		Chief Financial Officer	X		
	Chastity Ware		Chief Medical Officer	X		
	Kristy Canter		Case Manager	X		
Advocates	Sheila Schuster	Advocacy Action Network	Executive Director	X	X	X
	Tara Grieshop-Goodwin	KY Youth Advocates	Deputy Director		X	

Informant type	Name	Organization	Title	Years Interviewed		
				1	2	3
	Andrea Bennett	KY Youth Advocates	Senior Policy Analyst	X		
	Rich Seckel	KY Equal Justice Center	Director	X	X	
	Regan Hunt	KY Voices for Health	Executive Director		X	
	Jodi Mitchell		Former Executive Director	X		

Appendix B. Focus Group Recruitment

TABLE B.1

Recruitment Strategies for 10 Participant Categories

Participant category	Location	Date (2013)	Recruitment strategy
1. Parents of children with special health care needs	Lexington	July 8 and July 10	Clinic staff at the Commission for Children with Special Health Care Needs recruited parents on particular days until 12 agreed.
2. Medicaid beneficiaries with disabilities	Lexington	July 8	Front desk staff discussed the focus groups with all potentially eligible patients until 12 were recruited.
3. Medicaid beneficiaries with behavioral health care needs	Lexington	July 9	Front desk staff recruited the first 10 patients who walked through the door on a given day and agreed to participate.
4. Parents of nondisabled children	Lexington	July 9	Front desk staff distributed information and sign-up sheets to all potentially eligible patients until 12 agreed to participate.
5. Parents of nondisabled children	Hazard	July 10	A particular day was targeted and patients were recruited until 12 agreed.
6. Medicaid beneficiaries with disabilities	Hazard	July 10	Front desk staff distributed information and sign-up sheets to all potentially eligible patients until 12 were recruited.
7. Parents of children with special health care needs	Hazard	July 11	Front desk staff distributed information and sign-up sheets to all potentially eligible patients until 12 agreed.
8. Medicaid beneficiaries with behavioral health care needs	Hazard	July 11	Recruited six patients from Perry Therapeutic Rehabilitation and six patients from Perry Solutions. Recruited the first patients encountered until six of each type agreed.
9. Medicaid beneficiaries with disabilities	Madisonville	July 13	Contacted home health patients to ask for their participation in focus groups. Began with a random number in the patient roster of a home health agency and called until 12 participants were recruited.
10. Parents of nondisabled Medicaid children	Madisonville	July 13	Front desk staff distributed information and sign-up sheets to all potentially eligible patients until 12 agreed to participate.

Appendix C. Results for Enrollees in Region 3

TABLE C.1

Differences in Annual Spending by Category in Region 3 (includes 0 and non-0 spending years)

Spending Categories (= average annual spending in this category)	Children	Adults
Sample size – pre	150,535	35,462
Sample size – post	83,300	17,779
Annual spending – pre	\$1,969	\$6,822
Annual spending – post	\$1,480	\$4,801
Skilled nursing spending – pre	N/A	\$177
Skilled nursing spending – post	N/A	\$88
Inpatient spending – pre	\$416	\$2,315
Inpatient spending – post	\$304	\$1,786
“Other” spending – pre	\$538	\$416
“Other” spending – post	\$381	\$177
Outpatient hospital spending – pre	\$378	\$2,404
Outpatient hospital spending – post	\$279	\$1,514
Office spending – pre	\$432	\$660
Office spending – post	\$369	\$507
Home care spending – pre	\$49	\$352
Home care spending – post	\$36	\$282
Community mental health spending – pre	\$40	\$33
Community mental health spending – post	\$31	\$37
ER spending – pre	\$44	\$154
ER spending – post	\$30	\$139
Lab spending – pre	\$12	\$131
Lab spending – post	\$13	\$134
Transportation spending – pre	\$1.1	\$61
Transportation spending – post	\$0.8	\$52

Source: 2010, 2011, and 2013 analysis of Kentucky’s Medicaid enrollment and claims.

TABLE C.2

Differences in Annual Spending Prevalence by Category in Region 3

Spending categories - extensive margin only (= 1 for any annual spending in this category)	Children	Adults
<i>Sample size - pre</i>	150,535	35,462
<i>Sample size - post</i>	83,300	17,779
Any annual spending - pre	94.79%	92.33%
Any annual spending - post	90.99%	91.35%
Any skilled nursing spending - pre	N/A	0.64%
Any skilled nursing spending - post	N/A	0.69%
Any inpatient spending - pre	4.59%	21.32%
Any inpatient spending - post	3.93%	18.59%
Any "other" spending - pre	17.91%	33.33%
Any "other" spending - post	15.32%	25.42%
Any outpatient hospital spending - pre	49.93%	74.61%
Any outpatient hospital spending - post	44.18%	69.75%
Any office spending - pre	90.74%	81.87%
Any office spending - post	83.36%	78.14%
Any home care spending - pre	6.40%	17.36%
Any home care spending - post	6.76%	18.88%
Any community mental health spending - pre	3.02%	3.50%
Any community mental health spending - post	3.46%	3.63%
Any ER spending - pre	34.18%	52.44%
Any ER spending - post	28.72%	51.71%
Any lab spending - pre	19.22%	49.93%
Any lab spending - post	11.76%	49.86%
Any transportation spending - pre	1.08%	9.32%
Any transportation spending - post	0.94%	9.74%

Source: 2010, 2011, and 2013 analysis of Kentucky's Medicaid enrollment and claims.

TABLE C.3

Differences in Annual Utilization in Region 3 (includes 0 and non-0 utilization years)

Utilization categories (= average annual utilization of this type)	Children	Adults
<i>Sample size – pre</i>	150,535	35,462
<i>Sample size – post</i>	83,300	17,779
# Inpatient – pre	0.062	0.316
# Inpatient – post	0.068	0.256
# Avoidable inpatient – pre	N/A	0.045
# Avoidable inpatient – post	N/A	0.041
# 7-day readmits – pre	0.016	0.046
# 7-day readmits – post	0.015	0.033
# 30-day readmits – pre	0.032	0.089
# 30-day readmits – post	0.030	0.063
# 90-day readmits – pre	0.031	0.087
# 90-day readmits – post	0.038	0.076
# ER – pre	0.583	1.417
# ER – post	0.650	1.358
# Avoidable ER – pre	0.341	0.855
# Avoidable ER – post	0.384	0.843
# Outpatient – pre	2.906	5.673
# Outpatient – post	2.158	4.865
# Prevent – pre	0.870	0.195
# Prevent – post	0.599	0.132
# EPSDT – pre	0.853	N/A
# EPSDT – post	0.593	N/A
# Dental – pre	1.059	0.696
# Dental – post	1.094	0.670

Source: 2010, 2011, and 2013 analysis of Kentucky's Medicaid enrollment and claims.

TABLE C.4

Differences in Annual Utilization Prevalence in Region 3

Utilization categories for extensive margin only (= 1 for any annual utilization of this type)

	Children	Adults
Sample size – pre	150,535	35,462
Sample size – post	83,300	17,779
Any inpatient – pre	3.24%	18.61%
Any inpatient – post	3.08%	16.23%
Any avoidable inpatient – pre	N/A	2.75%
Any avoidable inpatient – post	N/A	2.72%
Any 7-day readmits – pre	1.27%	3.25%
Any 7-day readmits – post	1.15%	2.56%
Any 30-day readmits – pre	2.16%	5.24%
Any 30-day readmits – post	2.42%	4.13%
Any 90-day readmits – pre	2.71%	6.18%
Any 90-day readmits – post	2.94%	4.94%
Any ER – pre	33.98%	50.91%
Any ER – post	35.95%	51.59%
Any avoidable ER – pre	21.90%	37.80%
Any avoidable ER – post	23.94%	39.25%
Any outpatient – pre	74.60%	81.17%
Any outpatient – post	63.18%	77.52%
Any preventive care – pre	58.58%	16.50%
Any preventive care – post	43.97%	12.15%
Any EPSDT visits – pre	57.77%	N/A
Any EPSDT visits – post	43.52%	N/A
Any dental – pre	55.46%	32.19%
Any dental – post	53.91%	29.92%

Source: 2010, 2011, and 2013 analysis of Kentucky’s Medicaid enrollment and claims.

TABLE C.5

Differences in Mental Health Care Utilization Prevalence in Region 3

Utilization categories - extensive margin only (= 1 for any utilization of this type)	Children	Adults
any targeted case management - pre	6.61%	8.39%
any targeted case management - post	7.40%	6.63%
any crisis stabilization services - pre	0.74%	0.01%
any crisis stabilization services - post	0.38%	0.03%
any rehabilitation services - pre	0.05%	0.24%
any rehabilitation services - post	0.02%	0.08%
prompt follow up after an mental health discharge - pre	13.46%	39.04%
prompt follow up after an mental health discharge - post	14.07%	38.13%

Source: 2010, 2011, and 2013 analysis of Kentucky's Medicaid enrollment and claims.

TABLE C.6

Demographic Characteristics of Enrollees in Region 3

Demographic characteristics of enrollees	Children	Adults
Sample size – pre	150,535	35,462
Sample size – post	83,300	17,779
% Female – pre	49%	70%
% Female – post	49%	69%
% Nonwhite – pre	65%	47%
% Nonwhite – post	48%	30%
% Age 0–10 – pre	64%	N/A
% Age 0–10 – post	63%	N/A
% Age 11–18 – pre	36%	N/A
% Age 11–18 – post	37%	N/A
% Age 19–30 – pre	N/A	32%
% Age 19–30 – post	N/A	27%
% Age 31–40 – pre	N/A	24%
% Age 31–40 – post	N/A	25%
% Age 41–50 – pre	N/A	20%
% Age 41–50 – post	N/A	20%
% Age 51–64 – pre	N/A	24%
% Age 51–64 – post	N/A	28%
% Region west – pre	N/A	N/A
% Region west – post	N/A	N/A
% Region central – pre	N/A	N/A
% Region central – post	N/A	N/A
% Region east – pre	N/A	N/A
% Region east – post	N/A	N/A
% Region Passport – pre	100%	100%
% Region Passport – post	100%	100%
% KCHIP eligible – pre	15%	0.16%
% KCHIP eligible – post	15%	0.02%
% AFDC eligible – pre	23%	37%
% AFDC eligible – post	21%	37%
% SOBRA eligible – pre	51%	3%
% SOBRA eligible – post	53%	3%
% Foster care eligible – pre	3%	0.19%
% Foster care eligible – post	4%	0.01%
% SSI eligible – pre	4%	59%
% SSI eligible – post	3%	60%
% Other eligible – pre	4%	0.10%
% Other eligible – post	3%	0.05%
% Mental health diagnosis – pre	5%	26%
% Mental health diagnosis – post	6%	26%
Mean Charlson Index score – pre	0.120	0.795
Mean Charlson Index score – post	0.144	0.944

TABLE C.7

Estimated Changes in Annual Spending by Category in Region 3 (ordinary least squares model – includes 0 and non-0 spending years)

Outcome	Beta	SE	P-value	Sample size
Children				
Total spending \$	-596.97	50.24	0.000	233,835
Skilled nursing \$	N/A			
Inpatient \$	-157.41	20.46	0.000	233,835
Other \$	-193.21	26.54	0.000	233,835
Outpatient hospital \$	-112.02	10.27	0.000	233,835
Office \$	-70.63	8.10	0.000	233,835
Home \$	-12.35	4.92	0.013	233,835
Community mental \$	-10.93	8.13	0.181	233,835
ER \$	-14.66	0.97	0.000	233,835
Lab \$	-0.25	0.90	0.784	233,835
Transport \$	-0.37	0.06	0.000	233,835
Adult				
Total spending \$	-2,489.97	165.82	0.000	53,241
Skilled nursing \$	-99.04	27.48	0.000	53,241
Inpatient \$	-740.77	120.64	0.000	53,241
Other \$	-224.48	34.19	0.000	53,241
Outpatient hospital \$	-1,082.62	62.49	0.000	53,241
Office \$	-172.44	17.08	0.000	53,241
Home \$	-98.17	19.33	0.000	53,241
Community mental \$	3.70	4.04	0.361	53,241
ER \$	-20.07	2.67	0.000	53,241
Lab \$	-0.31	2.49	0.900	53,241
Transport \$	-13.41	3.76	0.001	53,241

Source: 2010, 2011, and 2013 analysis of Kentucky's Medicaid enrollment and claims.

TABLE C.8

Estimated Changes in Annual Spending Prevalence by Category in Region 3 (linear probability models)

Outcome	Beta	SE	P-value	Sample size	Mean	Marginal effect
Children						
Any spending \$	-0.039	0.005	0.000	233,835	93.44%	-4%
Any skilled nursing \$	N/A					
Any inpatient \$	-0.009	0.001	0.000	233,835	4.35%	-21%
Any other \$	-0.031	0.007	0.000	233,835	16.99%	-19%
Any outpatient hospital \$	-0.061	0.007	0.000	233,835	47.88%	-13%
Any office \$	-0.076	0.010	0.000	233,835	88.11%	-9%
Any home \$	0.002	0.002	0.495	233,835	6.53%	2%
Any community mental \$	0.003	0.001	0.037	233,835	3.17%	8%
Any ER \$	-0.057	0.007	0.000	233,835	32.23%	-18%
Any lab \$	-0.077	0.015	0.000	233,835	16.56%	-47%
Any transport \$	-0.001	0.0003	0.000	233,835	1.03%	-12%
Adult						
Any spending	-0.015	0.001	0.000	53,241	92.00%	-2%
Any skilled nursing \$	-0.001	0.0003	0.051	53,241	0.66%	-9%
Any inpatient \$	-0.036	0.009	0.000	53,241	20.41%	-18%
Any other \$	-0.077	0.006	0.000	53,241	30.69%	-25%
Any outpatient hospital \$	-0.059	0.008	0.000	53,241	72.99%	-8%
Any office \$	-0.046	0.003	0.000	53,241	80.62%	-6%
Any home \$	0.0004	0.007	0.952	53,241	17.87%	0%
Any community mental \$	0.002	0.003	0.536	53,241	3.54%	5%
Any ER \$	-0.011	0.005	0.027	53,241	52.19%	-2%
Any lab \$	-0.014	0.010	0.193	53,241	49.90%	-3%
Any transport \$	-0.001	0.002	0.759	53,241	9.46%	-1%

Source: 2010, 2011, and 2013 analysis of Kentucky's Medicaid enrollment and claims.

TABLE C.9

Estimated Changes in Annual Utilization in Region 3 (ordinary least squares model – includes 0 and non-0 utilization years)

Outcome	Beta	SE	P-value	Sample size
Children				
# Inpatient	-0.002	0.004	0.555	233,835
# Avoidable inpatient	N/A			
# 7-day readmits	-0.004	0.002	0.085	17,787
# 30-day readmits	-0.008	0.004	0.036	17,787
# 90-day readmits	0.003	0.002	0.085	17,787
# ER	0.059	0.021	0.005	233,835
# Avoidable ER	0.040	0.017	0.019	233,835
# Outpatient	-0.796	0.031	0.000	233,835
# Preventive visits	-0.268	0.030	0.000	233,835
# EPSDT visits	-0.257	0.031	0.000	233,835
# Dental visits	0.025	0.032	0.436	233,835
Adult				
# Inpatient	-0.081	0.009	0.000	53,241
# Avoidable inpatient	-0.011	0.002	0.000	53,241
# 7-day readmits	-0.016	0.003	0.000	18,637
# 30-day readmits	-0.033	0.006	0.000	18,637
# 90-day readmits	-0.017	0.002	0.000	18,637
# ER	-0.063	0.026	0.016	53,241
# Avoidable ER	-0.014	0.017	0.411	53,241
# Outpatient	-1.033	0.171	0.000	53,241
# Preventive visits	-0.059	0.005	0.000	53,241
# EPSDT visits	N/A			
# Dental visits	-0.015	0.018	0.406	53,241

Source: 2010, 2011, and 2013 analysis of Kentucky's Medicaid enrollment and claims.

TABLE C.10

Estimated Changes in Annual Utilization Prevalence in Region 3 (linear probability models)

Outcome	Beta	SE	P-Value	Sample size	Mean	Marginal effect
Children						
Any inpatient	-0.004	0.001	0.000	233,835	3.18%	-13%
Any avoidable inpatient	N/A					
Any 7 day readmits	-0.003	0.001	0.016	17,787	1.23%	-24%
Any 30 day readmits	0.0001	0.002	0.955	17,787	2.25%	0%
Any 90 day readmits	-0.0002	0.001	0.907	17,787	2.79%	-1%
Any ER	0.017	0.007	0.012	233,835	34.68%	5%
Any avoidable ER	0.019	0.008	0.019	233,835	22.63%	8%
Any outpatient	-0.118	0.018	0.000	233,835	70.53%	-17%
Any preventive care	-0.146	0.019	0.000	233,835	53.37%	-27%
Any EPSDT visits	-0.143	0.020	0.000	233,835	52.70%	-27%
Any dental visits	-0.018	0.011	0.095	233,835	54.91%	-3%
Adult						
Any inpatient	-0.031	0.007	0.000	53,241	17.81%	-18%
Any avoidable inpatient	-0.004	0.002	0.010	53,241	2.74%	-15%
Any 7 day readmits	-0.009	0.002	0.000	18,637	3.02%	-30%
Any 30 day readmits	-0.015	0.003	0.000	18,637	4.88%	-31%
Any 90 day readmits	-0.016	0.002	0.000	18,637	5.77%	-27%
Any ER	0.006	0.008	0.443	53,241	51.14%	1%
Any avoidable ER	0.014	0.005	0.012	53,241	38.29%	4%
Any outpatient	-0.049	0.003	0.000	53,241	79.95%	-6%
Any preventive care	-0.041	0.003	0.000	53,241	15.05%	-27%
Any EPSDT visits	N/A					
Any dental visits	-0.018	0.005	0.000	53,241	31.43%	-6%

Source: 2010, 2011, and 2013 analysis of Kentucky's Medicaid enrollment and claims.

TABLE C.11

Estimated Changes in Annual Mental Health Care Utilization Prevalence in Region 3 (linear probability models)

Mental health services utilization (= 1 for any utilization of this type)	Beta	SE	P-value	Sample size	Mean	Marginal effect
Children						
Any targeted case management	-0.0018	0.0093	0.844	19,080	6.87%	-3%
Any crisis stabilization services	-0.0049	0.0013	0.000	19,080	0.62%	-79%
Any rehabilitation services	-0.0005	0.0001	0.000	19,080	0.04%	-126%
Prompt mental health discharge follow up	-0.0094	0.0140	0.499	1,547	13.77%	-7%
Adult						
Any targeted case management	-0.0184	0.0057	0.001	18,374	7.80%	-24%
Any crisis stabilization services	0.00009	0.0001	0.371	18,374	0.02%	43%
Any rehabilitation services	-0.0021	0.0002	0.000	18,374	0.19%	-111%
Prompt mental health discharge follow up	-0.0370	0.0268	0.168	672	38.69%	-10%

Source: 2010, 2011, and 2013 analysis of Kentucky's Medicaid enrollment and claims.

TABLE C.12

**Estimated Changes in Annual Spending by Category with Individual Fixed Effects in Region 3
(ordinary least squares model – includes 0 and non-0 spending years)**

Outcome	Beta	SE	P-value	Sample size
Children				
Total spending \$	-754.48	82.39	0.000	233,835
Skilled nursing \$	N/A			
Inpatient \$	-249.28	30.64	0.000	233,835
Other \$	-226.83	32.99	0.000	233,835
Outpatient hospital \$	-138.35	16.69	0.000	233,835
Office \$	-62.88	12.42	0.000	233,835
Home \$	-34.29	2.99	0.000	233,835
Community mental \$	-3.61	5.35	0.502	233,835
ER \$	-19.51	1.39	0.000	233,835
Lab \$	4.46	1.18	0.000	233,835
Transport \$	-0.02	0.08	0.816	233,835
Adult				
Total spending \$	-1,781.46	106.25	0.000	53,241
Skilled nursing \$	58.95	15.17	0.000	53,241
Inpatient \$	-391.46	79.56	0.000	53,241
Other \$	-228.23	36.16	0.000	53,241
Outpatient hospital \$	-991.49	50.25	0.000	53,241
Office \$	-181.86	14.77	0.000	53,241
Home \$	-13.62	34.97	0.698	53,241
Community mental \$	4.71	5.34	0.380	53,241
ER \$	-21.75	2.98	0.000	53,241
Lab \$	2.29	3.74	0.542	53,241
Transport \$	6.61	7.81	0.399	53,241

Source: 2010, 2011, and 2013 analysis of Kentucky’s Medicaid enrollment and claims.

TABLE C.13

Estimated Changes in Annual Spending Prevalence by Category with Individual Fixed Effects in Region 3 (linear probability models)

Outcome	Beta	SE	P-value	Sample size	Mean	Marginal effect
Children						
Any spending \$	-0.048	0.007	0.000	233,835	93.44%	-5%
Any skilled nursing \$	N/A					
Any inpatient \$	-0.022	0.001	0.000	233,835	4.35%	-51%
Any other \$	-0.026	0.007	0.001	233,835	16.99%	-15%
Any outpatient hospital \$	-0.096	0.010	0.000	233,835	47.88%	-20%
Any office \$	-0.086	0.013	0.000	233,835	88.11%	-10%
Any home \$	-0.019	0.003	0.000	233,835	6.53%	-29%
Any community mental \$	0.009	0.004	0.018	233,835	3.17%	28%
Any ER \$	-0.094	0.009	0.000	233,835	32.23%	-29%
Any lab \$	-0.088	0.019	0.000	233,835	16.56%	-53%
Any transport \$	-0.001	0.001	0.220	233,835	1.03%	-7%
Adult						
Any spending \$	-0.018	0.002	0.000	53,241	92.00%	-2%
Any skilled nursing \$	0.004	0.001	0.000	53,241	0.66%	61%
Any inpatient \$	-0.034	0.006	0.000	53,241	20.41%	-17%
Any other \$	-0.072	0.006	0.000	53,241	30.69%	-23%
Any outpatient hospital \$	-0.063	0.009	0.000	53,241	72.99%	-9%
Any office \$	-0.048	0.003	0.000	53,241	80.62%	-6%
Any home \$	0.023	0.008	0.006	53,241	17.87%	13%
Any community mental \$	0.001	0.002	0.683	53,241	3.54%	3%
Any ER \$	-0.023	0.006	0.000	53,241	52.19%	-4%
Any lab \$	-0.011	0.013	0.389	53,241	49.90%	-2%
Any transport \$	0.010	0.002	0.000	53,241	9.46%	10%

Source: 2010, 2011, and 2013 analysis of Kentucky's Medicaid enrollment and claims.

TABLE C.14

Estimated Changes in Annual Utilization with Individual Fixed Effects in Region 3 (ordinary least squares model – includes 0 and non-0 utilization years)

Outcome	Beta	SE	P-value	Sample size
Children				
# Inpatient	-0.006	0.005	0.300	233,835
# Avoidable inpatient	N/A			
# 7-day readmits	-0.004	0.003	0.296	17,787
# 30-day readmits	-0.014	0.004	0.002	17,787
# 90-day readmits	-0.010	0.002	0.000	17,787
# ER	-0.065	0.011	0.000	233,835
# Avoidable ER	-0.044	0.007	0.000	233,835
# Outpatient	-1.096	0.045	0.000	233,835
# Preventive visits	-0.594	0.027	0.000	233,835
# EPSDT visits	-0.583	0.027	0.000	233,835
# Dental visits	0.202	0.046	0.000	233,835
Adult				
# Inpatient	-0.056	0.007	0.000	53,241
# Avoidable inpatient	-0.001	0.001	0.393	53,241
# 7-day readmits	-0.015	0.002	0.000	18,637
# 30-day readmits	-0.021	0.005	0.000	18,637
# 90-day readmits	-0.009	0.002	0.000	18,637
# ER	-0.142	0.027	0.000	53,241
# Avoidable ER	-0.070	0.017	0.000	53,241
# Outpatient	-0.946	0.157	0.000	53,241
# Preventive visits	-0.059	0.005	0.000	53,241
# EPSDT visits	N/A			
# Dental visits	-0.077	0.014	0.000	53,241

Source: 2010, 2011, and 2013 analysis of Kentucky’s Medicaid enrollment and claims.

TABLE C.15

Estimated Changes in Annual Utilization Prevalence with Individual Fixed Effects in Region 3 (linear probability models)

Outcome	Beta	SE	P-value	Sample size	Mean	Marginal effect
Children						
Any inpatient	-0.013	0.001	0.000	233,835	3.18%	-40%
Any avoidable inpatient	N/A					
Any 7-day readmits	-0.002	0.001	0.044	17,787	1.23%	-17%
Any 30-day readmits	-0.007	0.002	0.000	17,787	2.25%	-29%
Any 90-day readmits	-0.011	0.002	0.000	17,787	2.79%	-38%
Any ER	-0.022	0.004	0.000	233,835	34.68%	-6%
Any avoidable ER	-0.017	0.004	0.000	233,835	22.63%	-7%
Any outpatient	-0.149	0.023	0.000	233,835	70.53%	-21%
Any preventive care	-0.266	0.022	0.000	233,835	53.37%	-50%
Any EPSDT visits	-0.263	0.023	0.000	233,835	52.70%	-50%
Any dental visits	0.044	0.014	0.002	233,835	54.91%	8%
Adult						
Any inpatient	-0.029	0.005	0.000	53,241	17.81%	-16%
Any avoidable inpatient	0.002	0.001	0.136	53,241	2.74%	6%
Any 7-day readmits	-0.007	0.002	0.000	18,637	3.02%	-25%
Any 30-day readmits	-0.008	0.003	0.001	18,637	4.88%	-17%
Any 90-day readmits	-0.010	0.002	0.000	18,637	5.77%	-17%
Any ER	-0.011	0.007	0.103	53,241	51.14%	-2%
Any avoidable ER	-0.0001	0.003	0.973	53,241	38.29%	0%
Any outpatient	-0.046	0.004	0.000	53,241	79.95%	-6%
Any preventive care	-0.040	0.003	0.000	53,241	15.05%	-27%
Any EPSDT visits	N/A					
Any dental visits	-0.033	0.004	0.000	53,241	31.43%	-11%

Source: 2010, 2011, and 2013 analysis of Kentucky's Medicaid enrollment and claims

Appendix D. Mental Health Stratification

TABLE D.1

Estimated Changes in Annual Spending by Category Stratified by Mental Health Status (includes 0 and non-0 spending years)

Outcome	Child No Mental Health			Child Mental Health		
	Beta	SE	P-value	Beta	SE	P-value
Total spending \$	-363.19	22.99	0.00	-2,746.14	200.62	0.00
Skilled nursing \$						
Inpatient \$	-60.01	13.68	0.00	-1,444.68	142.56	0.00
Other \$	-197.39	12.40	0.00	-845.85	86.59	0.00
Outpatient hospital \$	10.82	7.62	0.16	-32.48	21.03	0.13
Office \$	-181.30	24.41	0.00	-327.80	37.67	0.00
Home \$	11.03	3.54	0.00	-16.93	10.34	0.10
Community mental \$	3.25	5.60	0.56	19.38	49.81	0.70
ER \$	-4.89	0.57	0.00	-7.35	1.77	0.00
Lab \$	-2.68	0.47	0.00	-13.68	2.54	0.00
Transport \$	-0.60	0.18	0.00	-3.10	0.88	0.00

Outcome	Adult No Mental Health			Adult Mental Health		
	Beta	SE	P-Value	Beta	SE	P-Value
Total spending \$	-1,322.46	65.68	0.00	-1,896.61	131.43	0.00
Skilled nursing \$						
Inpatient \$	-514.06	41.33	0.00	-780.64	90.26	0.00
Other \$	-21.05	9.45	0.03	-115.84	34.42	0.00
Outpatient hospital \$	-108.60	32.24	0.00	1.09	52.40	0.98
Office \$	-420.45	40.84	0.00	-547.29	34.01	0.00
Home \$	-111.36	10.04	0.00	-136.80	15.70	0.00
Community mental \$	-3.25	1.26	0.01	9.73	21.62	0.65
ER \$	-15.14	1.43	0.00	-33.19	3.84	0.00
Lab \$	-53.49	13.38	0.00	-180.45	54.50	0.00
Transport \$	-14.11	1.81	0.00	-32.75	4.85	0.00

Source: 2010, 2011, and 2013 analysis of Kentucky's Medicaid enrollment and claims.

Note: The sample size for the child "no mental health" subsample was 642,931 child-years and the sample size for the child "mental health" subsample was 31,152. The sample size for the adult "no mental health" subsample was 179,074 adult-years and the sample size for the adult "mental health" subsample was 70,490.

TABLE D.2

Estimated Changes in Annual Utilization Stratified by Mental Health Status (includes 0 and non-0 spending years)

	Child No Mental Health			Sample size	Child Mental Health			Sample size
	Beta	SE	P-value		Beta	SE	P-value	
# Inpatient	-0.017	0.002	0.000	642,931	-0.296	0.038	0.000	31,152
# Avoidable inpatient								
# 7-day readmits	-0.006	0.001	0.000	54,477	-0.008	0.005	0.121	8,724
# 30-day readmits	-0.008	0.002	0.000	54,477	-0.008	0.007	0.269	8,724
# 90-day readmits	-0.011	0.002	0.000	54,477	-0.014	0.008	0.071	8,724
# ER	-0.072	0.010	0.000	642,931	-0.100	0.022	0.000	31,152
# Avoidable ER	-0.050	0.008	0.000	642,931	-0.073	0.014	0.000	31,152
# Outpatient	-0.935	0.121	0.000	642,931	-1.086	0.366	0.004	31,152
# Preventive visits	-0.063	0.014	0.000	642,931	-0.034	0.012	0.005	31,152
# EPSDT visits	-0.079	0.016	0.000	642,931	-0.046	0.011	0.000	31,152
# Dental visits	-0.029	0.012	0.015	642,931	-0.134	0.023	0.000	31,152

	Adult No Mental Health			Sample size	Adult Mental Health			Sample size
	Beta	SE	P-value		Beta	SE	P-value	
# Inpatient	-0.090	0.005	0.000	179,074	-0.139	0.010	0.000	70,490
# Avoidable inpatient								
# 7-day readmits	-0.020	0.002	0.000	179,074	-0.022	0.003	0.000	70,490
# 30-day readmits	-0.019	0.002	0.000	55,123	-0.026	0.004	0.000	29,171
# 90-day readmits	-0.045	0.005	0.000	55,123	-0.055	0.008	0.000	29,171
# ER	-0.043	0.004	0.000	55,123	-0.058	0.006	0.000	29,171
# ER	-0.182	0.017	0.000	179,074	-0.446	0.040	0.000	70,490
# Avoidable ER	-0.120	0.013	0.000	179,074	-0.287	0.027	0.000	70,490
# Outpatient	-0.232	0.070	0.001	179,074	1.292	0.133	0.000	70,490
# Preventive visits	0.005	0.005	0.298	179,074	0.005	0.009	0.562	70,490
# EPSDT visits								
# Dental visits	-0.040	0.008	0.000	179,074	-0.087	0.013	0.000	70,490

Source: 2010, 2011, and 2013 analysis of Kentucky's Medicaid enrollment and claims.

Appendix E. EPSDT Visits

In this appendix we describe several important differences between the EPSDT service measures we created for our analysis presented in this report and the official state EPSDT screening rates provided to CMS (and reported on the CMS web site, (<https://www.medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Benefits/Early-and-Periodic-Screening-Diagnostic-and-Treatment.html>)). The measures we created in this report are based on the sample of members selected for our study, and our analysis reports use of the services that would qualify as EPSDT measures based on paid claims only. The official CMS EPSDT screening rate is based on a specific eligibility sample denominator and uses EPSDT services provided to the denominator members to calculate a numerator for the Federal fiscal

allow calculation using denied claims in the numerator. As mentioned above, the EPSDT data (and all data) we use for this report includes only final PAID claims.

(line 7 screening rate)

We report the official EPSDT screening rate below for Kentucky and for the nation as a whole.

Table E.1 illustrates that the Kentucky EPSDT screening rate drops between Federal Fiscal Year (FFY) 2009 and FFY 2010, then increases in FFY 2011, the drops again in FFY 2012, before rising in FFY 2013 and finally remaining constant in FFY 2014.

Kentucky EPSDT Screening Rate, CMS 416 Reports		National EPSDT Screening Rate, CMS 416 Reports				
Eligibility Category	2009	2010	2011	2012	2013	2014
Categorically Needy	76%	69%	83%	78%	83%	83%
Medically Needy	74%	66%	92%	86%	87%	88%
Total	75%	69%	84%	79%	83%	83%

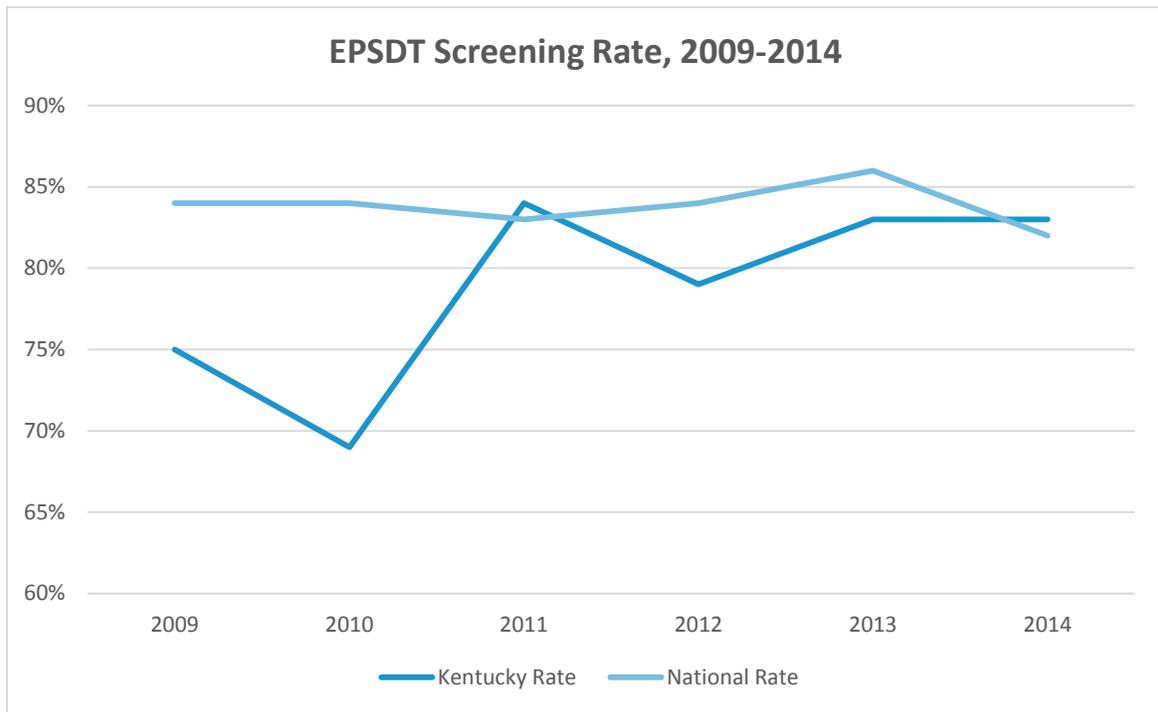
National EPSDT Screening Rate, CMS 416 Reports		Kentucky EPSDT Screening Rate, CMS 416 Reports				
Eligibility Category	2009	2010	2011	2012	2013	2014
Categorically Needy	83%	84%	82%	83%	85%	82%
Medically Needy	93%	90%	87%	94%	100%	91%
Total	84%	84%	83%	84%	86%	82%

TABLE E.1
CMS Reported EPSDT Screening Rate for Kentucky and the Nation, 2009-14

<https://www.medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Benefits/Early-and-Periodic-Screening-Diagnostic-and-Treatment.html>

FIGURE E.1

CMS Reported EPSDT Screening Rate for Kentucky, 2009–14



Our interpretation of this figure is that there is no consistent pattern in terms of the official state EPSDT screening rates over this time period. This stands in contrast to the reductions in EPSDT utilization we observed in the paid claims dataset among the enrollees in our sample. The inclusion of denied claims in the official state EPSDT screening rates could potentially explain some of this difference.

Notes

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20. Billings et al. 2000. Miller (2012) is a recent example of another study that uses the Billings method to classify ER visits.
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22. The Kentucky Cabinet for Health and Family Services website provides the following definition of the EPSDT program: "The EPSDT Screening Program provides routine physicals or well-child checkups for Medicaid eligible children at certain specified ages. It is considered preventive care. Children are checked for medical problems early. Specific tests and treatments are recommended as children grow older. The areas of health care that are checked include: preventive check-ups; growth and development assessments; vision; hearing;

teeth; immunizations; and laboratory tests. Children should receive health check-ups regularly or before the following ages: 1 month; 2 months; 4 months; 6 months; 9 months; 12 months; 15 months; 18 months; 24 months; 3 years; 4 years; 5 years; 6 years; 8 years; and once a year for ages 10-20. The EPSDT Special Services Program allows coverage for items or services which are medically necessary and which are not covered somewhere else in Medicaid. It is considered treatment.” See the cabinet website (<http://chfs.ky.gov/dms/epsdt.htm>) for further information.

23. Discussions of this issue are available from the Substance Abuse and Mental Health Services Administration (http://store.samhsa.gov/draft/NBHQF_DRAFT_082613.pdf) and the Agency for Healthcare Research and Quality (<http://www.qualitymeasures.ahrq.gov/content.aspx?id=48641>).
24. To be more specific, SOBRA stands for the Sixth Omnibus Budget Reconciliation Act of 1986. This act extended Medicaid coverage to pregnant women and young children up to 100 percent of the federal poverty level. For more information, see Gruber (2000).
25. For more information about the Charlson Comorbidity Index, see Charlson et al. (1987) and Hall (2006).
26. Of course, in 2013 enrollees in Region 3 could switch from Passport to another MCO, but they would still be covered under some form of MMC.
27. For more detail on the first two years, see Palmer et al. (2012, 2013).
28. Appalachian Regional Healthcare et al. v. Coventry Health and Life Insurance Company, et al. Civil Action No. 5:12-CV-114-KSF, U.S. District Ct, Eastern District of Kentucky, June 20, 2012.
29. Members received notification of the transition by July 6, 2013.
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35. The fixed-effects models are identified from the subset of our sample enrolled in both the pre- and post-reform time periods, but the non-fixed-effects models are identified from cross-sectional variation. Thus enrollees who are only enrolled in the pre- or the post-reform time periods contribute to the estimation of the non-fixed-effects models, but not to the fixed-effects models.
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37. As an additional validity check to explore potential problems related to lack of prompt follow up after discharge from a mental health hospital, we reviewed overall aggregate discharges from all mental health hospitals in Kentucky from 2010 to 2014. If Medicaid recipients were experiencing difficulty receiving therapy

in the community, we may expect to see increases in admissions/discharges for the hospitals after implementation of managed care. However, the data shows a steady slight downward trend in use of mental health hospitalizations for the entire period.

38. It may also be worth implementing additional monitoring with respect to the relationship between managed care and Medicaid participation and utilization disparities. Marton and Yelowitz (2015) reports that the implementation of MMC in the Passport region led to reductions in Medicaid participation among children while Marton, Yelowitz, Shores, and Talbert (2015) find that it led to a reduction in utilization disparities among whites and nonwhites. Marton, J. and A. Yelowitz. 2015. Health Insurance Generosity and Conditional Coverage: Evidence from Medicaid Managed Care in Kentucky. *Southern Economic Journal*, forthcoming; Marton, J. A. Yelowitz, M. Shores, and J. Talbert. 2015. Does Medicaid Managed Care Help Equalize Racial and Ethnic Disparities in Utilization? *Health Services Research*, forthcoming.

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