

The Colorado Regional Integrated Care Collaborative

**Managing Health Care for Medicaid Recipients with
Disabilities:**

**Final Report on the Kaiser Permanente Colorado
Coordinated Care Pilot Program**

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Overview

Coordinated care programs are designed to address problems that can arise when individuals with multiple chronic conditions seek health care. They might need attention from several doctors, which can result in duplicative tests or prescriptions for contraindicated medications. Coordinated care programs attempt to minimize these problems by helping individuals make appropriate use of the health care system. Such programs may be an important policy option for aged and disabled Medicaid recipients, who account for almost 75 percent of Medicaid spending.

This report presents two-year results from an MDRC evaluation of a pilot coordinated care program run by Kaiser Permanente Colorado, which is part of the Kaiser Permanente managed care consortium. Kaiser Permanente Colorado care managers assessed each individual's health care and social service needs, provided educational information about medical conditions, coordinated care across providers, and helped individuals make and keep medical appointments. The program aimed to improve the quality of care while reducing Medicaid costs by helping individuals use appropriate care that is intended to reduce hospital admissions and emergency department visits.

To understand whether the Kaiser Permanente Colorado program had effects, about 2,600 blind or disabled Medicaid recipients in two Denver-area counties were assigned at random to either a program group, which had access to the coordinated care program, or a control group, which did not.

Key Findings

- **Care managers faced a number of challenges implementing the program.** For example, they had difficulty contacting eligible individuals, who did not always have a permanent address or phone service.
- **The program increased the use of specialists and nonphysician providers, but had little effect on other aspects of health care use.** The frequency of primary care visits, hospital admissions, emergency department visits, and use of prescription medications was similar for the program and control groups. The program did increase the use of specialists, perhaps because individuals could use specialists from the Kaiser Permanente system. It also increased care from providers who are not medical doctors, such as optometrists and physical therapists.
- **Results from other coordinated care programs suggest how to improve program design.** More effective programs have used in-person contact, targeted individuals at high risk of hospitalization, and focused on managing transitions from hospital to home. In contrast, Kaiser Permanente Colorado care management occurred mostly by telephone, included a broad cross-section of disabled Medicaid recipients, and did not have information on hospital admissions outside the Kaiser Permanente system.

Although the program had only modest effects on health care use, they were generally more positive than for a similar pilot run by Colorado Access. This disparity may reflect differences in the pilots. For instance, Kaiser Permanente care managers and providers used one electronic records system, which was not the case for Colorado Access. In addition, the evaluation did not measure quality of care, use of social services, and patients' satisfaction with care, which were all program goals.

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Preface

Within the Medicaid system for low-income individuals, the elderly and individuals with disabilities account for only 25 percent of recipients but almost 75 percent of spending. Many individuals in this high-needs group face multiple chronic conditions, which can result in the use of expensive prescription medications or frequent trips to the hospital emergency room. These problems may be exacerbated by the fee-for-service Medicaid system, which provides little incentive for health care providers to avoid duplicative care, to provide preventive care, or to keep track of the entirety of a patient's health care needs.

One promising idea for helping this high-needs group is to use health care professionals — care managers — to assess an individual's health care needs and to work with doctors to make sure those needs are being addressed. Many states have some form of coordinated care for Medicaid recipients, but few rigorous studies have been conducted on the effects of such services for a broad group of recipients with disabilities. This report helps to fill the gap by presenting results from a pilot coordinated care program that was operated in the Denver area by Kaiser Permanente Colorado. Conceived by the Colorado Department of Health Care Policy and Financing and the Center for Health Care Strategies, the evaluation included more than 2,600 Medicaid recipients with disabilities, some of whom were assigned at random to be eligible for the Kaiser Permanente coordinated care program.

Several aspects of the Kaiser Permanente program stand out. First, care managers and Kaiser Permanente doctors used the same electronic health care system, which provided care managers with access to information about the person's appointments, prescribed medications, test results, and admissions to hospitals in the Kaiser Permanente system that could be used in communicating with clients and doctors. In addition, program group members could use Kaiser Permanente specialists, who generally did not see other Medicaid recipients. The coordinated care program also built on the organization's considerable experience — for example, using an existing service to intervene with individuals who made frequent visits to the emergency room. Finally, Kaiser Permanente used a multidisciplinary care team that included nurses to help with medical needs, social workers to help with behavioral health problems, and community specialists to help individuals with other social service needs.

While the program did increase the use of specialty care and nonphysician providers such as physical therapists, it had little impact on use of preventive care, in part because most individuals saw a primary care provider even without the program, so there was little room for improvement. Nonetheless, the evaluation provides unusually rigorous information about the effects of a typical program that may help in designing more effective services in the future.

Gordon L. Berlin
President, MDRC

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The Authors

Executive Summary

Coordinated care programs are designed to address and circumvent problems that can arise when individuals with multiple chronic conditions seek health care. Their health care needs might require the attention of several specialists, which can result in duplicative tests or prescriptions for contraindicated medications, especially if they don't have a primary care provider or their primary care provider is not keeping track of their overall health care use or needs. Lack of primary care might also mean that some chronic conditions remain undetected, which might require the patient to seek emergency care or to be admitted to the hospital, increasing health care costs. Coordinated care programs attempt to minimize these problems by using care managers to assess individuals' health care needs and help them make appropriate use of the health care system before a medical emergency occurs. Such programs may be an important policy tool for aged and disabled Medicaid recipients, who account for about 25 percent of the Medicaid population but almost 75 percent of Medicaid spending.¹

This report presents results through two years from an evaluation conducted by MDRC of a pilot coordinated care program run in the Denver area by Kaiser Permanente Colorado, which is part of the Kaiser Permanente national managed care consortium based in Oakland, California. This pilot program and a similar program run by Colorado Access were part of the Colorado Regional Integrated Care Collaborative (CRICC), which was a multiyear partnership of the Colorado Department of Health Care Policy and Financing (HCPF), the Center for Health Care Strategies, local health plans and providers, and other stakeholders that was designed to improve care for high-needs Medicaid recipients.

As part of this program, Kaiser Permanente CRICC care managers undertook a number of activities, mostly by telephone. First, they made sure that each individual in the program had a primary care provider, who could be considered the individual's first contact for care and would have some responsibility for ensuring that the individual's health care needs were being addressed. Early on, the care manager also assessed each individual's health care needs and social service needs. These assessments were used to develop goals that are related to health care (such as reducing emergency department use) and social service needs (such as arranging for transportation to a doctor's office or helping the individual find stable housing). Based on the health assessment, care managers scheduled more frequent calls with individuals who were categorized as "high risk" based on their health and recent hospitalizations or emergency department use, or who had greater needs than others based on the care manager's clinical judgment. Depending on an individual's needs, care managers provided educational information on medical conditions, coordinated care across providers, and helped individuals use the

¹Vladeck (2003).

health care system (for example, by making appointments for them and accompanying them to those appointments).

The goals of the Kaiser Permanente CRICC program were to encourage people to make greater use of preventive health care and thereby to reduce hospital admissions and visits to the emergency department in the long term. Since care managers might uncover unmet medical needs, use of other types of care — such as specialty care — might also increase in the short term.

To understand whether the program affected health care use in these ways, the evaluation used a random assignment design. Between June 2009 and September 2010, all blind or disabled Medicaid recipients in Jefferson and Denver counties who were eligible for the study and the program (and who were in the traditional Medicaid fee-for-service system) were assigned at random to a program group, which had access to the Kaiser Permanente CRICC coordinated care program, or to a control group, which did not have access to coordinated care. In total, 2,618 people were randomly assigned, with 70 percent (1,831 people) assigned to the program group and 30 percent (787 people) assigned to the control group. Random assignment ensures that the program and control groups were similar in all respects when they entered the study. Comparing subsequent outcomes for the two groups, therefore, provides reliable estimates of the effects of being assigned to the program group.

Maximus, the state’s enrollment broker, sent a letter to program group members explaining that they had been assigned to Medicaid managed care and asking them to choose one of three managed care programs — Kaiser Permanente Colorado, Denver Health, or the Primary Care Physician Program — or to choose to remain in traditional fee-for-service Medicaid. Individuals who did not make a choice by the end of the month were automatically (that is, “passively”) enrolled in the Kaiser Permanente Colorado system. Kaiser Permanente CRICC staff then attempted to recruit their enrollees into an enhanced version of their standard coordinated care services, which were available for up to two years. In addition to covering health care, the enhanced program focused on social and other nonclinical needs more intensively than the standard Kaiser Permanente Colorado services. Control group members remained in the fee-for-service system without coordinated care services for the two years of the evaluation.

Using data on health care use provided by the Colorado Department of Health Care Policy and Financing, this report estimates the effects of passive enrollment into the Kaiser Permanente Colorado system on the use of health care services. The results indicate that the Kaiser Permanente CRICC program increased use of specialty care and care by providers who are not doctors, such as physical therapists and optometrists. (See Table ES.1 for the estimated impacts of passive enrollment into the Kaiser Permanente CRICC coordinated care program on key

Colorado Regional Integrated Care Collaborative: Kaiser Permanente

Table ES.1

Estimated Impacts of CRICC Pilot, Months 1-24 After Month of Passive Enrollment

| Outcome | Program Group | Control Group | Difference (Impact) |
|--|---------------|---------------|---------------------|
| <u>Use of outpatient services (%)</u> | | | |
| Any type of visit with a primary care physician | 73.7 | 71.0 | 2.7 |
| Wellness visit | 62.6 | 61.4 | 1.1 |
| Nonphysician visit | 23.3 | 19.9 | 3.4 ** |
| Specialist visit | 72.0 | 68.4 | 3.6 ** |
| <u>Hospital admissions and emergency department use (%)</u> | | | |
| Ever admitted to a hospital | 21.7 | 23.4 | -1.7 |
| Readmitted within 30 days | 5.4 | 4.4 | 1.0 |
| Ever used an emergency department | 51.5 | 53.4 | -2.0 |
| <u>Filling prescription medications (%)</u> | | | |
| Filled any prescription medication | 77.5 | 75.3 | 2.2 |
| Sample size (total = 2,618) | 1,831 | 787 | |

SOURCE: MDRC calculations based on Medicaid claims data from the Colorado Department of Health Care Policy and Financing and on Kaiser Permanente data.

NOTE: A two-tailed t-test was applied to differences between the outcomes for the program and control groups. Statistical significance levels are indicated as follows:

*** = 1 percent, ** = 5 percent, * = 10 percent.

outcomes across the two-year study period.) These effects were concentrated among individuals who had multiple chronic conditions or had used substantial Medicaid resources in the past (not shown in the table). Although the program did appear to affect health care use over the two-year period, the effects of the program were generally small and not statistically significant on the more immediate targets of the intervention: primary care, hospital admissions and readmissions, and emergency department visits. An implementation study suggests some reasons why the program may have had few effects. In particular, care managers struggled to engage individuals in coordinated care services. In addition, most care management was provided by telephone, while recent research suggests that intensive in-person contact may be needed in order for care coordination to be effective.²

Although the results suggest that Kaiser Permanente’s CRICC program had relatively little effect on Medicaid use, the study had several limitations that are worth keeping in mind.

²Brown (2009).

First, the study did not have information about other types of outcomes, such as use of social services and quality of care, both of which were targeted by the Kaiser Permanente CRICC program. Second, just more than half of the program group remained in the Kaiser Permanente CRICC program and thus had access to its enhanced coordinated care services. Although the analysis attempted to adjust for this, the results may still have missed some areas where the program was effective. Finally, there is some evidence that coordinated care may take longer than two years to reduce hospital admissions, so the program might have had greater effects if it had been in operation for a longer time. Nevertheless, the small estimated effects are consistent with recent findings that suggest that coordinated care programs should have more intensive, in-person services than those that were included in the Kaiser Permanente CRICC program.

MDRC is releasing two additional reports in 2013 on related pilots. A report on another CRICC pilot program in Colorado, the Colorado Access Coordinated Care Pilot Program, was released in April. Like the Kaiser Permanente CRICC program, the Colorado Access CRICC program was found to increase the use of nonphysician providers.³ However, the effects of the Colorado Access program were generally smaller than those presented in the current report. In addition to reports on the two Colorado pilots, a report will be released in fall 2013 on the Chronic Illness Demonstration Project, which provided coordinated care for high-needs Medicaid recipients with multiple chronic conditions in New York's fee-for-service Medicaid system.

³Michalopoulos, Manno, Kim, and Warren (2013).

Introduction

Coordinated care programs are designed to address and circumvent problems that can arise when individuals with multiple chronic conditions seek health care. Such individuals might need to see several specialists, which can result in duplicative tests or prescriptions for contraindicated medications, especially if they don't have a primary care provider (PCP) or their PCP is not keeping track of their overall health care use or needs. In addition, complications from undetected conditions might necessitate emergency care or hospitalization, increasing health care costs. Coordinated care programs attempt to minimize these problems by using care managers to assess individuals' health care needs and help them make appropriate use of the health care system before a medical emergency occurs. Such programs may be an important policy tool for aged and disabled Medicaid recipients, who account for about 25 percent of Medicaid recipients but almost 75 percent of Medicaid spending. To date, more than 20 states have introduced coordinated care programs for Medicaid recipients.¹

This report presents results through two years from an evaluation conducted by MDRC of a pilot coordinated care program run in the Denver area by Kaiser Permanente Colorado, which is part of the Kaiser Permanente national managed care consortium based in Oakland, California. This pilot program and a similar program run by Colorado Access are part of the Colorado Regional Integrated Care Collaborative (CRICC), which was a multiyear partnership of the Colorado Department of Health Care Policy and Financing (HCPF), the Center for Health Care Strategies (CHCS), local health plans and providers, and other stakeholders that was created to improve care for high-needs Medicaid recipients. CRICC is part of the four-state Rethinking Care Program (RTC) developed by CHCS to design and test care management interventions for high-needs Medicaid recipients. In addition to Colorado, RTC included pilots in New York (also being evaluated by MDRC), Pennsylvania, and Washington.

The Kaiser Permanente CRICC pilot program was an enhanced version of its standard coordinated care services, focusing more intensively on participants' social service and other nonclinical needs in addition to their medical needs. The program sought to increase the use of preventive care and to uncover unmet medical needs in order to reduce the need for hospital admissions and the use of emergency department (ED) care.² To understand whether the enhanced coordinated care program changed health care use, the evaluation used a random assignment design. Between June 2009 and September 2010, 2,618 blind or disabled Medicaid

¹Vladeck (2003).

²It is possible that coordinated care affected other outcomes, including use of health and social services, especially in light of the fact that care managers tried to help individuals take care of social service needs. However, information on those outcomes was not available to the study team and therefore was not included in the evaluation, which focuses solely on health care use through Medicaid.

recipients were randomly assigned to a program group that had access to the enhanced coordinated care program, or to a control group that did not have access to the program.

The MDRC evaluation included two components. An impact analysis estimated the effects of the program on different types of health care provided through the Medicaid system, while an implementation study was developed to learn about the design of the program and how it operated. Results through two years indicate that the program increased use of specialty care, especially physical therapists and optometrists, but showed few effects on primary care, hospital admissions, emergency department visits, or filling prescriptions for medications. The implementation study suggests some reasons why the program may have had few effects on those outcomes. In particular, care managers struggled to locate individuals and engage them in the enhanced coordinated care services. In addition, most care management was provided by telephone, while recent research suggests that intensive in-person contact may be needed in order for care coordination to be effective.³

The remainder of this report summarizes the research on coordinated care programs, describes the study design and study sample, describes the Kaiser Permanente CRICC program, and presents the estimated effects of the program.

³Brown (2009).

Background on Coordinated Care Programs

Coordinated care programs are intended to increase appropriate use of medical care while reducing unnecessary emergency department visits, hospital admissions, and use of other medical services. To meet patients' needs, care managers — who are usually nurses or master's-level clinicians — undertake a number of activities. They may encourage patients to seek proper treatment, help them make appointments with health care professionals, make sure they keep appointments and take prescribed medications, and educate them about treatment effectiveness.⁴ Effective care managers will also address patients' social service needs, such as those related to unstable housing or concerns about being able to buy enough food. Care managers may also work directly with primary care providers, giving them information that is designed to help them monitor a patient's overall health care use and communicate with other health care providers.

Many states have some form of coordinated care for Medicaid recipients, but the interventions differ with regard to what coordinated care means and who is targeted.⁵ For example, Illinois uses nurses, social workers, behavioral health workers, and clinic-based staff to provide care management to adults with disabilities and children with persistent asthma.⁶ Oklahoma provides patient education and care management services to recipients of Temporary Assistance for Needy Families (TANF) and aged, blind, and disabled Medicaid recipients.⁷ Iowa, Kansas, New Hampshire, Rhode Island, Texas, Virginia, Washington, and Wyoming provide care management via telephone and education materials to Medicaid recipients with chronic illnesses such as asthma, diabetes, and congestive heart failure.⁸ North Carolina uses a system of local networks of providers to support and manage high-cost, high-risk Medicaid recipients.⁹

Although several of these state coordinated care programs have been studied, those studies have not generally used the most rigorous statistical methods, leading to questions about the validity of their results. For example, a study in Oregon found that disease management via telephone for Medicaid recipients with asthma decreased emergency department visits and increased office visits.¹⁰ However, that study compared outcomes for a group of Medicaid recipients before and after they were part of the disease management program. Because it did not have a comparison group of individuals who did not receive the program, it is unclear how much of the change over time was a result of the program and how much would have happened

⁴Rittenhouse and Robinson (2006); Wagner et al. (2001).

⁵Arora et al. (2008).

⁶Saunders (2008).

⁷Arora et al. (2008).

⁸Arora et al. (2008).

⁹Arora et al. (2008); Community Care of North Carolina (2008).

¹⁰Linden, Berg, and Wadhwa (2007).

even without the intervention. A study of disease management for congestive heart failure, diabetes, asthma, and hypertension in Florida found improvement in a range of health behaviors and outcomes such as fewer hospital stays and emergency department visits,¹¹ but it compared people who volunteered with those who did not, and it is likely that volunteers differ from others in ways that would affect the results of the study.¹² In Virginia, a chronic disease management program for Medicaid recipients found decreased emergency department visits, hospital admissions, and physician office visits within the first two years.¹³ However, that study compared those who received the intervention with a comparison group who had similar demographics and pre-intervention health care use, but it did not use random assignment to create the two groups. Although the program group and comparison group looked similar, such methods can only adjust for observed differences between the groups but cannot adjust for unobserved differences such as motivation or health care preferences.¹⁴ In other contexts, such comparison groups have been found to produce unreliable estimates of the effects of social service programs.¹⁵

Three recent studies of coordinated care for Medicaid recipients have used a more rigorous, random assignment design. In Indiana, a chronic disease management program reduced Medicaid spending for individuals with congestive heart failure but not diabetes.¹⁶ Random assignment was also used in the Rethinking Care pilot in Washington that is described in the Introduction to this report.¹⁷ This program focused on a subset of aged, blind, and disabled Medicaid recipients who exhibited evidence of mental illness or chemical dependency and who were identified as being at high risk of having excessive medical expenses in the future. A community-based, multidisciplinary care management team that was led by registered nurses used in-person and telephone support to enable clients to address their own health care needs and to enhance the coordination, communication, and integration of services across safety net providers (that is, providers who offer health services to low-income populations and others without health insurance). However, the intervention did not generally show statistically significant changes in health care use during the first two years — meaning that the changes that were observed were likely a result of chance rather than the program. The third study was a random assignment evaluation of the Colorado Access CRICC coordinated care pilot program,

¹¹Morisky, Kominski, Afifi, and Kotlerman (2009); Afifi, Morisky, Kominski, and Kotlerman (2007).

¹²Bell, Orr, Blomquist, and Cain (1995).

¹³Zhang et al. (2008).

¹⁴Rosenbaum and Rubin (1983).

¹⁵Michalopoulos, Bloom, and Hill (2004).

¹⁶Holmes et al. (2008).

¹⁷Bell et al. (2012).

mentioned earlier, which had little effect on health care use but did increase the use of providers who are not medical doctors, such as optometrists and podiatrists.¹⁸

Randomized control trials have also been used to study coordinated care programs outside of the Medicaid system for severely ill patients with specific chronic conditions such as diabetes mellitus, asthma, depression, coronary artery disease, and congestive heart failure.¹⁹ These studies have shown that such programs can improve health outcomes for patients with those conditions. For instance, studies have shown that coordinated care helps to control diabetes,²⁰ reduces problems from cardiovascular disease,²¹ and reduces hospitalization for patients with congestive heart failure.²² In addition, coordinated care has increased the use of preventive care, such as cancer screening,²³ and improved the overall health of the elderly while reducing their ED visits.²⁴ Coordinated care has encouraged patients with depression to talk to mental health specialists, reduced their depression, and improved work performance and job retention.²⁵ Among Medicaid recipients, there is evidence that in-person care management is effective when it targets conditions such as diabetes, asthma, and congestive heart failure,²⁶ but less effective when targeting coronary artery disease.²⁷

Although most rigorous studies of coordinated care have focused on individuals who are suffering from particular chronic conditions such as depression or diabetes, there is some evidence that broad-based programs can be effective. In particular, a randomized trial of telephone support for nearly 200,000 individuals who were insured through one of seven employers found evidence of reduced health care costs, primarily through reduced hospitalizations.²⁸ It is not clear whether this approach would work for the more vulnerable group included in the current study, who are unlikely to be employed, have low income and complex health care needs, and rely on public rather than commercial health insurance.

Another source of positive findings for broader groups comes from the Medicare Coordinated Care Demonstration (MCCD), a random assignment study of 15 coordinated care

¹⁸Michalopoulos, Manno, Kim, and Warren (2013).

¹⁹Mattke, Seid, and Ma (2007); Wagner et al. (2001).

²⁰Villagra and Ahmed (2004); Dorr et al. (2005); Chin et al. (2007); Glazier, Bajcar, Kennie, and Willson (2006); Sidorov et al. (2002).

²¹Harris et al. (2003); Sequist et al. (2006).

²²Dewalt et al. (2006); Gorski and Johnson (2003).

²³Dietrich et al. (2006); Dietrich et al. (2007).

²⁴Counsell et al. (2007).

²⁵Wang et al. (2007); Mohr et al. (2008).

²⁶Arora et al. (2008); Warsi et al. (2004).

²⁷Arora et al. (2008).

²⁸Wennberg et al. (2010). The research samples in the Colorado studies were more vulnerable and disadvantaged than the sample in the Wennberg et al. study, which could account for the positive findings despite the fact that the program was conducted via telephone rather than in person.

programs for Medicare recipients.²⁹ Of the 15 programs included in MCCD, three included patients with a broad set of diagnoses while the remainder focused on either one or a small number of chronic conditions. The study found that the programs generally succeeded in providing health education but had few effects on individuals' overall satisfaction with care, adherence to care, health care use, or health care costs.³⁰

Although the MCCD programs had few effects overall, three of the programs reduced hospital admissions and health care costs over a four-year period. Comparing these three programs with the other twelve suggests that six structural and operational components influence the effectiveness of coordinated care for Medicare recipients.³¹

- **Targeting.** Success is more likely when coordinated care targets patients who are at substantial risk of needing hospitalization in the coming year.
- **In-person contact.** The most successful programs averaged nearly one in-person contact per month during the patient's first year in the program.
- **Access to timely information about hospital and ED admissions.** Connecting with patients shortly after flare-ups of chronic conditions that require hospitalization or ED visits is critical to providing care during the transition to home and avoiding readmissions.
- **Close interaction between care managers and primary care providers.** Occasional face-to-face interaction with physicians and ensuring that all program patients who are seeing a particular physician are assigned to the same care manager creates a strong working relationship.
- **Services provided.** The most successful programs assessed patients' needs, developed care plans, and coached patients on managing their conditions and taking medications properly. Successful programs were also more likely to provide social supports, such as help accessing resources like transportation and housing assistance.
- **Staffing.** More successful programs relied primarily on registered nurses to deliver the bulk of the intervention, and the median case load was 70. The role of social workers is important but it is unclear whether they should be care managers.

²⁹Brown et al. (2007); Peikes, Chen, Schore, and Brown (2009); Chen et al. (2008).

³⁰Peikes, Chen, Schore, and Brown (2009).

³¹Brown (2009).

Although these lessons from MCCD are intriguing, again it is unclear whether they would apply to the group served in the Kaiser Permanente CRICC pilot, which is probably younger but more likely to have a disability than the group studied in MCCD.

As the discussion above indicates, there has been a great deal of research on the effects of coordinated care for specific chronic conditions. However, except for MDRC's evaluation of the Colorado Access coordinated care pilot program,³² there have been no rigorous evaluations of coordinated care programs for a diverse set of high-needs Medicaid recipients with multiple chronic conditions. This is an important gap in the research because more than 20 states have some form of coordinated care for Medicaid recipients.³³

³²Michalopoulos, Manno, Kim, and Warren (2013).

³³Rosenman et al. (2006); Arora et al. (2008).

Overview of the Study

Individuals were eligible for the study if they were receiving Medicaid through one of three programs: (1) Aid to the Needy Disabled, which provides cash assistance to individuals who have a disability that is expected to last at least six months and that precludes them from working; (2) Aid to the Blind, which provides cash assistance to low-income individuals who meet the Social Security Administration’s definition of blindness;³⁴ and (3) Old Age Pension-B, which provides financial assistance to low-income individuals under age 65. Individuals were to be excluded from the study if they were under 21 years of age or 65 or older, were eligible for both Medicare and Medicaid, were receiving Medicaid through Home and Community-Based Services waivers for individuals with brain injury or AIDS, or were in a nursing facility or long-term care facility.³⁵ All individuals were receiving fee-for-service Medicaid when they entered the study.³⁶

Figure 1 illustrates the flow of people into the study. Each month, Maximus — Colorado’s enrollment broker — sent MDRC a list of people who were supposed to be eligible for the program in Denver and Jefferson counties. MDRC randomized the group so that 70 percent were placed into a program group and 30 percent were placed into the control group. Between June 2009 and September 2010, MDRC randomly assigned 2,618 Medicaid recipients to the study, with 1,831 assigned to the program group and 787 assigned to the control group. The program group was larger than the control group to ensure that Kaiser Permanente CRICC care managers had enough individuals to serve.

At the beginning of each month after randomization, Maximus sent letters to the program group telling them that they were being enrolled in Medicaid managed care and asking them to choose one of three managed care programs — Kaiser Permanente Colorado, Denver Health, or the Primary Care Physician Program — or to choose to remain in fee-for-service

³⁴The Social Security Administration defines statutory blindness as having “central visual acuity of 20/200 or less in your better eye with use of a correcting lens” or having “a visual field limitation in your better eye, such that the widest diameter of the visual field subtends an angle no greater than 20 degrees.” See Social Security Administration (2013).

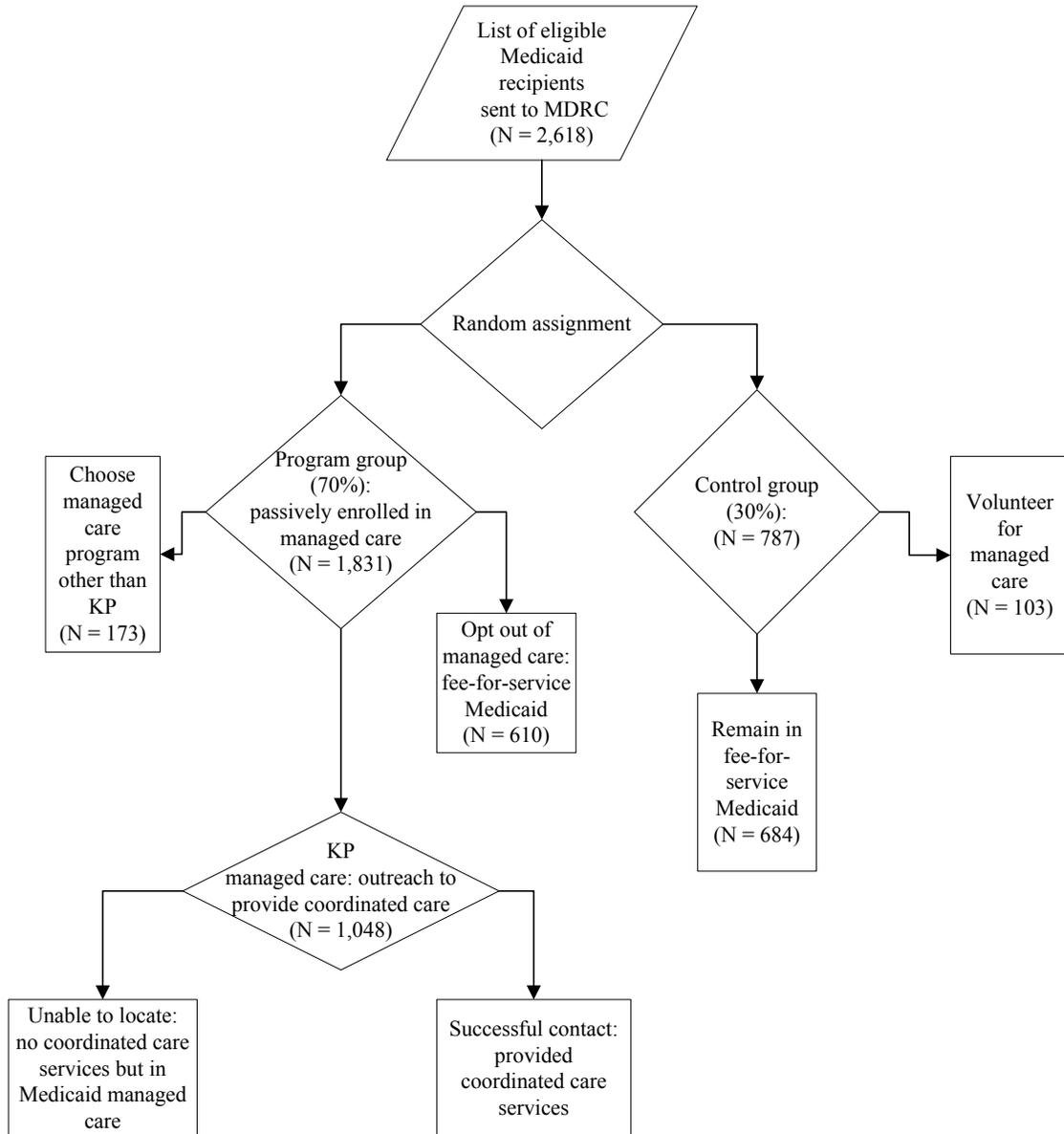
³⁵Home and Community-Based Services waivers provide Medicaid benefits to certain groups who would not otherwise be eligible for Medicaid and who agree to receive services in their home or community rather than in a nursing facility or through long-term hospital care. See Colorado Department of Health Care Policy and Financing (n.d.).

³⁶“Fee-for-service” is the traditional approach to paying for health care in the United States, in which patients can visit the physician of their choice — both PCPs and specialists — and the physician determines the fees for specific services. In a typical managed care approach, by contrast, a health plan contracts with a network of providers who are paid a set fee for services, and members of the health plan must get their care from the network providers (to whom they make a copayment) or pay extra to use providers outside the network; managed care plans generally also require preauthorization for a visit to a specialist.

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Figure 1

Flow of Recipients into the Kaiser Permanente Colorado (KP) Program



Medicaid. The mailing also contained a chart with information about the four options, a brochure about choosing a Medicaid health plan, a health plan report card, and a list of doctors who were associated with each health plan. Individuals could indicate their choice by calling a toll-free number by the end of the month in which the mailing went out. Those who did not make a choice by the end of the month were enrolled in Kaiser Permanente Colorado's CRICC program (passive enrollment). All individuals could change their choice within 90 days of the mailing or one year after the mailing (and in practice they could change their choice at any time).

Here is an example of the process for program group members, who were eligible to receive CRICC coordinated care services through the Kaiser Permanente Colorado program. In June 2009, 220 Medicaid recipients in Denver and Jefferson counties were randomized to the program group. On July 1, Maximus mailed enrollment letters to those individuals. Anyone who did not respond by July 31 was assigned (passively enrolled) to Kaiser Permanente's CRICC program. Each person had until the end of September (three months after the letter was mailed) to make a different decision or to opt out of Kaiser Permanente Colorado (for those who had been assigned to it by default).

The control group remained in fee-for-service Medicaid without coordinated care services. To receive permission from the Centers for Medicare and Medicaid Services (CMS) to allow individuals to be randomized, control group members were allowed to volunteer for managed care. This allowed the state to argue that it was not denying access to the program to anyone who was eligible for it.

Kaiser Permanente Colorado attempted to find program group members who were enrolled in its system in order to engage them in the program's enhanced coordinated care services. Individuals who enrolled in a different managed care plan or who opted to remain in fee-for-service Medicaid did not receive Kaiser Permanente CRICC coordinated care services.

The program and control groups were maintained for two years after randomization. That is, program group members could receive an enhanced version of Kaiser Permanente's standard coordinated care services for two years, as long as they were in Kaiser Permanente Colorado, and control group members could remain in fee-for-service Medicaid for two years (at which point the state had the option of placing them into a managed care program). The enhanced coordinated care program focused more intensively on social and other nonclinical services than did the standard program.

Table 1 shows some characteristics of the counties that were included in the evaluation, and compares them with Colorado overall and with the United States. Of Colorado's population of roughly five million, 22.8 percent live in Denver and Jefferson counties. Not surprisingly, the two counties are more urban than the rest of the state, with population density ranging as high as

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Table 1

Characteristics of the CRICC Service Area

| Characteristics | Denver County | Jefferson County | Colorado | United States |
|---|------------------|---------------------|-----------|---------------|
| <u>Demographic and economic</u> | | | | |
| Population | 584,563 | 528,564 | 4,884,568 | 301,237,703 |
| Median annual household income (\$) | 45,002 | 65,909 | 56,574 | 52,175 |
| Residents below the federal poverty level (%) | 18.7 | 7.9 | 11.9 | 13.2 |
| Language other than English spoken at home (%) | 29.7 | 11.1 | 11.9 | 13.2 |
| High school graduate, over age 25 ^a (%) | 82.5 | 92.3 | 88.6 | 84.5 |
| Bachelor's degree or higher, over age 25 (%) | 38.0 | 38.1 | 35.0 | 27.4 |
| Unemployment rate (%) | 5.9 | 5.4 | 5.3 | 6.4 |
| Public transportation use ^b (%) | 8.2 | 3.7 | 3.3 | 4.9 |
| <u>Type of health insurance</u> | | | | |
| Medicaid | 68,839 | 70,631 | 576,691 | 42,600,000 |
| Uninsured ^c | 117,919 | 77,305 | 687,670 | 46,340,000 |
| <u>Supplemental Security Income (SSI) recipients</u> | | | | |
| Number of recipients | 12,911 | 4,387 | 60,004 | 10,289,474 |
| Number of blind or disabled recipients | 10,384 | 3,758 | 51,148 | 8,765,288 |

SOURCES: U.S. Census Bureau, Annual Social and Economic Supplement to 2009 Current Population Survey, 2008 American Community Survey; 2008-2009 Colorado Household Survey; Social Security Administration (SSA), 2008; Centers for Medicare and Medicaid Services, 2008-2010.

NOTES:

^aIncludes high school equivalency.

^bThis measure is the percentage of all workers, age 16 and over, who use public transportation (excluding taxicab) to travel to work.

^cData drawn from the 2008-2009 Colorado Household Survey. U.S. numbers are estimates from the 2008 SSA report, *Income, Poverty, and Health Insurance Coverage in the United States: 2008*.

3,873.0 people per square mile in Denver County, compared with 48.5 people per square mile for the state and 87.4 for the country. While Denver County is worse off economically than the rest of the state, Jefferson County is better off.

There was substantial variability in demographics across the counties. For example, 11.1 percent of Jefferson County residents speak a language other than English at home compared with 29.7 percent in Denver County. Educational attainment likewise varied, with 83 percent of Denver County residents having graduated from high school compared with 92 percent in Jefferson County. About 38 percent of residents in both counties had graduated from college.

In terms of health care, the percentage of individuals on Medicaid was 13.4 percent in Jefferson County and 11.8 percent in Denver County. The Medicaid recipients in this study

were thus part of a small minority in each county. Consistent with this, less than 1 percent of adults in Jefferson County and less than 3 percent of adults in Denver County received Supplemental Security Income, a program that provides cash assistance for low-income individuals with disabilities and that most individuals in the study were required to apply for.

According to interviews with Kaiser Permanente Colorado staff, most medical services were available in communities where members lived. The first source of care was Kaiser Permanente Colorado providers, whom CRICC members were required to use for primary care. Access to specialist physicians was also not challenging because members had full access to Kaiser Permanente Colorado's specialists and could also see any specialists who accepted Medicaid patients. Another common source of care for Medicaid recipients is Federally Qualified Health Centers (FQHCs), or community health centers, of which there were 9 in Jefferson County and more than 50 in Denver County.³⁷ There are also several safety net hospitals throughout the region, such as Denver Health and University of Colorado Hospital, although Kaiser Permanente CRICC staff rarely interacted with the safety net system.

Staff did express some concern about the availability of several types of services. First, they noted that it took up to six weeks to get an appointment at the Jefferson Center for Mental Health. In addition, access to dental services was limited because Medicaid in Colorado covers only extractions and few dentists do pro bono work or have sliding fee scales. Medicaid also did not generally pay for eye care. Finally, staff said that social services — including affordable housing and food resources — were also limited.

³⁷U.S. Department of Health and Human Services, Health Resources and Services Administration. See http://findahealthcenter.hrsa.gov/Search_HCC.aspx.

Analytical Issues

Random assignment ensures that the program and control groups are similar in all respects when they enter the study except that one group — the program group — was passively enrolled in the Kaiser Permanente Colorado system and eligible for its coordinated care services if they did not select one of the other managed care programs or if they elected to remain in the Medicaid fee-for-service plan. Because the two groups are similar, the effects of passive enrollment are estimated by comparing later outcomes for the full program and control groups. This approach is referred to as an “intent-to-treat” comparison because the intent was to provide the program to all individuals in the program group, even though it was understood that this was unlikely to happen because not everyone who was assigned to the program group would necessarily enroll or participate in the Kaiser Permanente CRICC managed care program (and thus in its enhanced coordinated care services).³⁸

The comparability of the program and control groups at baseline means that comparing outcomes for the two groups after random assignment provides reliable estimates of the effects of passive enrollment. These estimates will understate the effects of Kaiser Permanente CRICC coordinated care, however, to the extent that program group members joined a different managed care program or opted to remain in fee-for-service Medicaid. Nonetheless, finding statistically significant differences (explained below) between the program and control group outcomes would provide evidence that the Kaiser Permanente CRICC program did change health care use.

To assess whether the program made a difference, statistical significance is used. Briefly, statistically significant impact estimates are ones that are large enough that they are unlikely to have resulted from a program with no true effect. To assess statistical significance, two-tailed t-tests were performed at the 10 percent significance level. That means two things. First, using a two-tailed t-test means that either a large positive or a large negative difference would be interpreted as evidence of the program’s effect. This is appropriate because the coordinated care program might have increased health care use if it uncovered unmet needs, or reduced care from specialists and emergency department use through increased preventive care. Second, using a 10 percent significance level means that there is a 10 percent chance that a program with no true effect could generate a statistically significant impact estimate on any particular outcome. Thus,

³⁸Estimated effects were generated using linear regression adjustment to increase the statistical precision of the estimates. Covariates include number of Chronic Illness and Disability Payment System (CDPS) conditions, age, gender, the presence of certain categories of chronic conditions (cardiovascular, central nervous system, diabetes, gastrointestinal, psychiatric, pulmonary, and skeletal and connective tissue), county, and health care use through Medicaid in the past year (primary care visits, nonphysician visits, specialist visits, ED visits, hospital admissions, and number of prescription medications).

using statistical significance reduces the chance of incorrectly concluding that the program had an effect, but it does not eliminate it.

High-Needs Subgroup

When CRICC was being conceived, coordinated care was expected to have its largest effects for individuals who had made the greatest use of the health care system in the past year and had been diagnosed with the greatest number of chronic conditions. This is also consistent with the synthesis of coordinated care programs discussed earlier, which found the greatest success when coordinated care was targeted to patients who were at substantial risk of needing hospitalization in the coming year. Many in this group make frequent visits to the emergency department and are often hospitalized. By linking them to a primary care provider and helping them manage their conditions, coordinated care could help reduce their ED use and keep their conditions in check so they are less likely to be hospitalized. Thus, this report presents results both for the full sample involved in CRICC and for a subgroup of high-needs, frequent health care users.

To study this high-needs group, MDRC ranked individuals based on the costs of Medicaid services that they had used in the year before entering the study and their Chronic Illness and Disability Payment System (CDPS) score (also called the “Kronick score”), a method of predicting future health care costs of Medicaid recipients.³⁹ The two rankings were added together, and the top 20 percent highest-ranking cases were defined to be the high-needs subgroup.⁴⁰ Individuals with a number of serious health conditions that were not thought to be amenable to coordinated care were excluded from the high-needs subgroup, regardless of their previous health care use or CDPS score. These individuals included patients with hemophilia, sickle cell anemia, pulmonary hypertension, and major organ transplants, as well as patients who were on life support and patients who were being actively treated for cancer.⁴¹

High-Participation Subgroup

As noted later in this report, about half of the individuals who were assigned to the program group never enrolled in Kaiser Permanente Colorado (because they selected one of the

³⁹Kronick, Gilmer, Dreyfus, and Lee (2000).

⁴⁰This ranking was developed for the MDRC study of the Colorado Access pilot, and was developed in consultation with Colorado Access, HCPF, and the Center for Health Care Strategies

⁴¹Specifically, individuals were excluded from the high-needs subgroup if they had ever had one of the following ICD-9 diagnosis codes at any time prior to random assignment: 286.XX (hemophilia); 282.41, 282.42, 282.49, 282.5, 282.6X, 282.7, 282.8, 282.9 (sickle cell); 416.XX (pulmonary hypertension); V42.XX or 996.XX (major organ transplant). Individuals were also excluded from the high-needs subgroup if they had a CPT procedure code of 94005, 99504, E0450, E0460-E0461, E0463-E0464, E048 (life support) or 96401-96549 or 77261-77499 (cancer) in the 12 months prior to random assignment.

other managed care plans or chose to remain in fee-for-service Medicaid) and therefore could not have benefited from its coordinated care services. Because they could not have benefited from the program, including them in the analysis understates the effects of the program. The report therefore includes results for a “high-participation” subgroup of individuals; 67 percent of these program subgroup members were enrolled in Kaiser Permanente Colorado.

This subgroup was defined by looking at which demographic characteristics and which characteristics of their prior Medicaid use predicted which program group members were ever in the Kaiser Permanente Colorado system. This analysis resulted in a predicted probability of being in Kaiser Permanente Colorado for each individual in the sample. The sample was then divided in half, so program group and control group members who had the highest predicted probabilities were placed into the high-participation subgroup. Although it would be natural to compare program group members who actually enrolled in the program with the entire control group, enrollees are likely to differ from others in unobserved ways. For this reason, the analysis was based on a predicted probability of being an enrollee, which resulted in a subgroup of program group members who were much more likely to be enrolled in CRICC than were others in the sample.

Data Sources

Data that are used in this analysis come from Medicaid claims provided to MDRC by the Colorado Department of Health Care Policy and Financing. These claims provided information on Medicaid use for the entire sample before and for two years following passive enrollment. In addition, Kaiser Permanente Colorado provided information, by month, on which sample members were enrolled in its system.

HCPF data were available at the claim level. That is, information was available on the dates, location, procedures, diagnoses, and providers for each episode of care. Each claim was categorized as either involving outpatient care, having taken place in an ED, or involving a hospital admission. Outpatient care was classified as being primary care, specialty care, or nonphysician care, using information about the doctor’s specialty associated with its National Provider Identifier number (a number assigned by CMS for Medicare reimbursement), provider type code, and provider specialty code. Claims were then aggregated by individual and time period to determine the percentage of patients who were using different types of care over time and the amount of care used (such as number of visits to a primary care provider or number of inpatient days). Appendix A provides more information about how outcomes were defined.

HCPF data also provided information about Medicaid enrollment. This was used to examine the proportion of individuals who remained on Medicaid throughout the evaluation as well as which Medicaid recipients enrolled in a different managed care program other than Kaiser Permanente’s CRICC program, such as Denver Health. This information is important for

understanding the intent-to-treat effects, as neither of those groups could have benefited from CRICC coordinated care services.

Although these sources of data provide information on most Medicaid care during the study period, they are missing several key pieces of information. First, data may have been incomplete while individuals were in other managed care organizations, such as Denver Health. Second, behavioral health services are provided to the Medicaid population as a carve-out based on county of residence; Medicaid recipients are assigned to a behavioral health organization based on where they live. Data may have been incomplete for care that these organizations provided. Thus, the analysis may understate the amount of Medicaid-funded health care used by individuals in the study.

Outcomes

The evaluation includes a range of outcomes that could be examined using Medicaid claims data and reflects the logic of the coordinated care model — namely, that the program will encourage people to make greater use of preventive care and thereby reduce hospitalizations and visits to the emergency department.

- **Emergency department visits.** A successful coordinated care program should reduce ED visits by linking patients to a primary care provider and helping them make and keep appointments with that provider. The evaluation consequently examined impacts on the proportion of individuals who made an ED visit and the number of visits per person.
- **Hospital admissions.** The expected effect of coordinated care on hospital admissions is less clear. In the short term, the program might increase hospital admissions if care managers uncover unmet needs that warrant inpatient care. Over the longer term, however, coordinated care should increase use of preventive care and compliance with treatment, thus reducing the severity of illness and reducing the number and length of hospital stays. By working intensively with patients after they are released from hospital care, coordinated care might also keep them from being rehospitalized. For these reasons, the evaluation examined the effects of passive enrollment on the proportion of individuals ever admitted to the hospital, the number of hospital admissions, the average number of inpatient days, and the proportion of individuals who were readmitted within 30 days.
- **Outpatient care.** The program was expected to increase visits to primary care providers. It might also have increased visits to specialists if care managers or the primary care provider uncovered unmet medical needs, or be-

cause being a Kaiser Permanente CRICC member provided access to the organization's specialty care. Care coordination might also have reduced visits to specialists over the longer term if primary care providers were taking care of those medical needs. The evaluation therefore estimated the effect of the program on the use of various types of outpatient care.

- **Prescription medications.** Coordinated care might also affect the use of prescription medications. Care managers were expected to encourage individuals to take recommended medications and refill prescriptions. At the same time, care managers might have uncovered combinations of medications that are contraindicated, and then worked with health care providers to change the prescribed drug regimen. Because the appropriate drug regimen for individuals with multiple chronic conditions is sometimes unclear, this document reports only the average number of prescriptions filled by the program group compared with the control group. Thus, changes in the specific medications that individuals are taking will not be detected in the analysis if they do not change the number of prescriptions that are filled.

Characteristics of the Sample

Table 2 describes the study sample, including two measures of demographics (age and gender) and health care use and diagnoses under Medicaid for the year prior to passive enrollment. Because randomization resulted in similar program and control groups, the table does not show the characteristics of each group. Also, because program group members were allowed to opt out of Kaiser Permanente Colorado, the second and third columns of the table show characteristics for those who did and did not opt out at some time following passive enrollment.

The average age for sample members is about 44 years, and about 44 percent of the sample is male. The sample was quite sick, with the average person having been diagnosed with nearly three chronic conditions in the year before entering the study. Common conditions diagnosed in the prior year include cardiovascular disease (38.2 percent of the study sample), diseases of the central nervous system (22.4 percent), gastrointestinal disorders (25.1 percent), psychiatric disorders (32.3 percent), pulmonary system disorders (29.6), and skeletal and connective tissue disorders (26.8 percent), all of which were somewhat higher in the non-enrollee sample than among the Kaiser Permanente CRICC enrollees. In addition, the CDPS score was 1.8 for the full sample, meaning that they were expected to use about 80 percent more health care than the average Medicaid recipient with disabilities. The bottom panel of the table suggests some ways that the CRICC program could make a difference, as more than 40 percent of the sample had made an ED visit in the prior year, 20 percent had been hospitalized, and the average sample member used nearly \$16,500 in paid Medicaid care.

Individuals could opt out of the Kaiser Permanente Colorado system and remain in fee-for-service for any reason. Because those who did not opt out were required to use primary care providers in the Kaiser Permanente system, individuals may have opted out so they could continue seeing doctors with whom they had an established relationship. If that is true, it would suggest that those who opted out used more health care than those who enrolled in the Kaiser Permanente CRICC program.

Consistent with this possibility, in the year before passive enrollment, those who enrolled in the Kaiser Permanente CRICC program (that is, those who did not opt out of the program) used \$15,537 in paid Medicaid claims compared with \$16,868 for those who opted out. In addition, the CDPS score was 1.8 for the full sample, as mentioned above, and 1.7 for Kaiser Permanente CRICC enrollees, indicating that enrollees were expected to use about 10 percent less health care than other sample members.

As discussed earlier, it was anticipated that the effects of the CRICC program would be larger for a high-needs subgroup that was expected to make the greatest use of the health care

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Table 2

**Selected Demographics, Health Care Use, and Chronic Health Conditions,
Year Before Study Entry, by Full Sample and Enrollment Status of
Program Group**

| Characteristic | Full sample | Program Group | |
|---|-------------|-------------------------------|-----------------------------------|
| | | Enrolled in Kaiser Permanente | Not enrolled in Kaiser Permanente |
| <u>Demographics</u> | | | |
| Average age (years) | 44.0 | 43.1 | 46.2 *** |
| Male (%) | 44.4 | 44.9 | 44.6 |
| <u>Health care use in prior year</u> | | | |
| Had emergency department visit (%) | 43.3 | 44.2 | 42.5 |
| Average number of emergency department visits | 1.4 | 1.5 | 1.2 ** |
| Had hospital admission (%) | 20.1 | 18.7 | 20.6 |
| Average number of hospital admissions | 0.4 | 0.4 | 0.4 |
| Average number of days in hospital | 3.3 | 3.2 | 3.3 |
| Total Medicaid costs (\$) | 16,449 | 15,537 | 16,868 |
| <u>Chronic conditions</u> | | | |
| Average number of chronic conditions | 2.9 | 2.7 | 3.0 ** |
| Chronic condition (%) | | | |
| Cancer | 7.0 | 5.3 | 9.2 *** |
| Cardiovascular | 38.2 | 36.2 | 40.4 * |
| Central nervous system | 22.4 | 23.0 | 21.2 |
| Developmental disability | 4.2 | 4.3 | 3.5 |
| Diabetes, type 1 or 2 | 15.6 | 14.7 | 14.9 |
| Gastrointestinal | 25.1 | 23.9 | 25.9 |
| Hematological | 6.2 | 6.0 | 7.0 |
| Infectious | 9.7 | 9.1 | 11.4 |
| Metabolic | 15.1 | 14.4 | 16.5 |
| Pregnancy | 2.5 | 2.8 | 1.3 ** |
| Psychiatric | 32.3 | 32.4 | 33.3 |
| Pulmonary | 29.6 | 27.1 | 32.4 ** |
| Renal | 13.4 | 12.3 | 13.7 |
| Skeletal and connective tissue | 26.8 | 26.1 | 27.3 |
| Skin | 10.3 | 10.3 | 10.9 |
| Substance abuse | 14.4 | 13.8 | 15.7 |
| Cerebrovascular | 3.4 | 2.5 | 3.5 |
| Genital | 4.9 | 3.7 | 5.9 ** |
| None | 22.9 | 25.4 | 19.7 *** |
| Average CDPS score ^a | 1.8 | 1.7 | 1.8 * |
| Sample size | 2,618 | 1,048 | 783 |

SOURCE: MDRC calculations based on Medicaid claims data from the Colorado Department of Health Care Policy and Financing.

NOTES: The statistical significance levels of differences between Kaiser Permanente enrollees and nonenrollees are indicated as follows: *** = 1 percent, ** = 5 percent, * = 10 percent.

^aThe higher the CDPS score, the higher the expected use of the health care system.

system. Table 3 (see next page) compares characteristics of the high-needs subgroup with the remainder of the sample. As expected, the high-needs subgroup is much sicker on average and made much greater use of the health care system in the previous year. They spent about two and a half times more on health care that was paid through Medicaid in the prior year than the remainder of the sample (\$31,780 versus \$12,612), made more than twice as many ED visits, had more than twice as many hospital stays, and spent more than twice as many days in hospitals (5.9 versus 2.6 days). The high-needs subgroup also had a CDPS score that was about twice as high as the remainder of the sample, and they faced many more chronic conditions: nearly 60 percent had cardiovascular disease and about 50 percent or more suffered from disorders of the central nervous system, gastrointestinal disorders, pulmonary disease, psychiatric disorders, and skeletal and connective tissue disorders. In fact, the high-needs subgroup suffered from about five chronic conditions on average, compared with about two for the remainder of the sample (shown in Table 3).

Another source of information about client characteristics was Kaiser Permanente Colorado. According to Kaiser's data, common medical diagnoses for CRICC members in 2010 included diabetes, heart failure, seizures, hypertension, and obesity.⁴² One doctor who was interviewed by the evaluation team noted that the Medicaid population requires a lot more work than the traditional Kaiser Permanente Colorado members because of their higher incidence of substance abuse and mental health conditions. The care team also described the members as medically complicated, often with multiple physical and behavioral health diagnoses and co-occurring conditions.

⁴²Conference call with MDRC, CHCS, Kaiser Permanente, and HCPF, April 6, 2010.

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Table 3

**Selected Demographics, Health Care Use, and Chronic Health Conditions,
Year Before Study Entry, High-Needs Subgroup and Remainder
of the Sample**

| Characteristic | High-Needs Subgroup | Remainder of the Sample |
|---|------------------------|----------------------------|
| <u>Demographics</u> | | |
| Average age (years) | 44.8 | 43.8 |
| Male (%) | 43.1 | 44.7 |
| <u>Health care use in prior year</u> | | |
| Had emergency department visit (%) | 69.9 | 36.7 *** |
| Average number of emergency department visits | 2.6 | 1.1 *** |
| Had hospital admission (%) | 44.9 | 13.9 *** |
| Average number of hospital admissions | 0.8 | 0.3 *** |
| Average number of days in hospital | 5.9 | 2.6 *** |
| Total Medicaid costs (\$) | 31,780 | 12,612 *** |
| <u>Chronic conditions</u> | | |
| Average number of chronic conditions | 5.3 | 2.3 *** |
| Chronic condition (%) | | |
| Cancer | 9.5 | 6.3 ** |
| Cardiovascular | 57.8 | 33.2 *** |
| Central nervous system | 51.2 | 15.2 *** |
| Developmental disability | 9.4 | 3.0 *** |
| Diabetes, type 1 or 2 | 26.9 | 12.7 *** |
| Gastrointestinal | 49.2 | 19.1 *** |
| Hematological | 10.5 | 5.1 *** |
| Infectious | 21.2 | 6.9 *** |
| Metabolic | 31.5 | 11.0 *** |
| Pregnancy | 2.5 | 2.5 |
| Psychiatric | 52.7 | 27.2 *** |
| Pulmonary | 56.5 | 22.9 *** |
| Renal | 27.7 | 9.8 *** |
| Skeletal and connective tissue | 49.8 | 21.0 *** |
| Skin | 20.8 | 7.7 *** |
| Substance abuse | 26.2 | 11.4 *** |
| Cerebrovascular | 6.5 | 2.6 *** |
| Genital | 7.8 | 4.1 *** |
| None | 0.0 | 28.6 *** |
| Average CDPS score ^a | 2.9 | 1.5 *** |
| Sample size | 524 | 2,094 |

SOURCE: MDRC calculations based on Medicaid claims data from the Colorado Department of Health Care Policy and Financing.

NOTES: The statistical significance levels of differences between Kaiser Permanente enrollees and nonenrollees are indicated as follows: *** = 1 percent, ** = 5 percent, * = 10 percent.

^aThe higher the CDPS score, the higher the expected use of the health care system.

Enrollment in Managed Care and Coordinated Care

As noted above, individuals who were assigned to the program group could opt out of the Kaiser Permanente Colorado system, either by choosing a different managed care provider or choosing to stay in fee-for-service Medicaid. Likewise, control group members could volunteer for Kaiser Permanente’s CRICC program and thus qualify for its enhanced coordinated care services. Finally, those who enrolled in the Kaiser Permanente CRICC program could ask to be disenrolled for many reasons — for example, they may have preferred fee-for-service care, wanted to transfer to another program, or did not want to change their primary care provider to one in the Kaiser Permanente Colorado network.

To the extent that those events happened, the intent-to-treat estimates will understate the effects of Kaiser Permanente CRICC enhanced coordinated care. A natural question in light of the design is how consistently individuals were enrolled in the Kaiser Permanente Colorado system, whether program group members opted for other managed care providers, and whether control group members volunteered for managed care. In the ideal scenario, everyone would have remained on Medicaid throughout the follow-up period and all program group members would have been enrolled in Kaiser Permanente’s managed care program throughout.

An analysis of HCPF Medicaid enrollment data and Kaiser Permanente CRICC enrollment information showed the following:

- Most sample members stayed enrolled in Medicaid through the 24 months following passive enrollment. By the end of two years, 90 percent of the program group remained enrolled in Medicaid.
- Just more than half of the program group — 57.2 percent — were in Kaiser Permanente’s CRICC program at some point during the two years following random assignment. Although control group members could volunteer for the CRICC program — reducing the treatment contrast between the program and control groups — only three control group members had done so (0.4 percent).
- Enrollment in the Denver Health managed care program — the main managed care program other than Kaiser Permanente Colorado that study members used — was about 9 to 12 percent following passive enrollment and was a similar rate for the program and control groups, suggesting that the results would not be biased by differential enrollment in the Denver Health program.

Outreach and Enrollment

Enrolling individuals in the Kaiser Permanente Colorado system was only the first step toward providing them with CRICC coordinated care. The next step was to engage individuals in those services.

As noted earlier, for the purposes of this study, Maximus notified recipients in writing of their assignment to Kaiser Permanente Colorado. Members who did not opt out within 30 days of receiving this notice were entered into Kaiser Permanente Colorado's membership system, which initiated the mailing of a Kaiser Permanente Colorado welcome card to the new member. This mailing often prompted individuals to ask about their placement into Kaiser Permanente Colorado.

Kaiser Permanente Colorado staff were responsible for outreach to new members who did not opt out. While many members could not be reached, would not return calls, or did not want to complete the questionnaire that was administered to new members, they did receive care within the Kaiser Permanente Colorado system.

Individuals who could be reached were administered a "triage" questionnaire before a care manager was assigned to them. The triage questionnaire, which consisted of 10 questions that were pulled from validated tools, was developed by researchers with the Kaiser Permanente Institute for Health Research and an expert on chronic care programs. Based on their responses, each person was given a rating, which was designed to help the care managers know the extent of support that the member might need. Community specialists noted that they often began providing community resource information to members, for example, about dental benefits or transportation options in that first contact. Formal care coordination did not commence until the care manager was assigned following the completion of the triage questionnaire.

One outreach challenge was the lack of accurate contact information. HCPF lists were often missing information or had incorrect information, so community specialists spent a lot of time making outreach attempts via phone and mail. Kaiser Permanente CRICC staff assessed their efforts and made modifications to improve their outcomes, including making calls early in the month shortly after state checks were received and when phones were still operational. They also personalized outreach letters to look less like government mail and look more inviting to open. As another means to improve contact outcomes, in 2010 Kaiser Permanente Colorado began using Interactive Voice Recognition (IVR) to make initial outreach to newly assigned members. Individuals received a letter inviting them to call the IVR line to answer the triage questions. The majority of individuals did not call, so the IVR system called them. Use of this technology saved time and helped the CRICC team to learn what phone numbers were valid.

Another outreach challenge was that, especially early on, the state assigned clients to CRICC who Kaiser Permanente Colorado had determined were not eligible for reimbursement

under its contract. For example, some individuals who were assigned to CRICC were receiving Medicaid under a waiver or were also receiving Medicare. The state eventually amended the contract with Kaiser Permanente Colorado to allow reimbursement for these individuals.

Perhaps because of these challenges, as of March 2011, only 449 members were enrolled in Kaiser Permanente. This is about 43 percent of the program group members who did not opt out of Kaiser Permanente Colorado for another managed care program or for fee-for-service Medicaid, or one-fourth of the full program group.⁴³

⁴³Kaiser Permanente (2011).

Program Implementation

Kaiser Permanente Colorado began operating its CRICC enhanced coordinated care program in June 2009 within its comprehensive health care delivery system. The description of Kaiser Permanente's CRICC program is based on information that was gathered from interviews with eight members of the health plan leadership, the care team supervisor, and five direct services staff who were responsible for providing coordinated care to the members. The research team also interviewed one Kaiser Permanente Colorado physician, one CRICC member, individuals from Kaiser Permanente Colorado's Institute for Health Research, and individuals from HCPF. Interviews were conducted in May 2010 and March 2011, primarily in groups based on the respective interviewees' roles. Because the study did not have the resources to analyze Kaiser Permanente Colorado's detailed records of coordinated care services and Kaiser Permanente Colorado told MDRC that it would be difficult to provide the information in electronic form, this report cannot draw strong conclusions about members' participation in or dosage of (that is, amount and intensity of) coordinated care services.

Organizational Structure

Overview of Kaiser Permanente and Kaiser Permanente Colorado

Kaiser Permanente was founded in 1945 and is a working partnership of two organizations: (1) the not-for-profit Kaiser Foundation Health Plan and Hospitals, which comprises the nation's largest nonprofit integrated health care delivery system; and (2) the for-profit Permanente Medical Groups, a physician group that sees only Kaiser health plan members. Nationally, Kaiser Permanente operates in California, Colorado, Georgia, Hawaii, the mid-Atlantic, the Northwest, and Ohio. Kaiser Permanente Colorado, operating since 1969, serves a half million members in the areas surrounding Denver and Colorado Springs.⁴⁴

In Colorado, the Kaiser Permanente system includes the following health care providers: The Colorado Permanente Medical Group, P.C., is a multispecialty physician group practice of more than 800 providers that contracts with Kaiser Foundation Health Plan in the state. Kaiser Foundation Health Plan's not-for-profit branch owns and operates 24 full-service medical offices in the Denver region, and at least two are colocated with behavioral health entities.

For hospital care, Kaiser Permanente Colorado uses three core hospitals in Denver: Exempla St. Joseph Hospital, Exempla Good Samaritan Medical Center, and The Children's Hospital. Kaiser Permanente Colorado physicians who work in the core hospitals have access to the Kaiser Permanente Colorado medical records system, and each hospital includes Kaiser

⁴⁴Kaiser Permanente (n.d.).

Permanente Colorado discharge planning staff. Kaiser Permanente Colorado also contracts with a number of other hospitals that have much weaker connections to the Kaiser Permanente Colorado infrastructure.

During the demonstration, CRICC was a relatively small program within Kaiser Permanente Colorado's large organization, with two lines of oversight. Kaiser Permanente Colorado's Other Government Programs office oversaw general Medicaid operations, including the contract with the state of Colorado. The Case and Care Coordination office oversaw the enhanced coordinated care program in partnership with the Other Government Programs team. Individuals from the Kaiser Permanente Institute for Health Research were involved as well — for example, designing the triage questionnaire that was mentioned earlier and conducting surveys of CRICC members about their satisfaction with program services.

Kaiser Permanente Colorado saw CRICC as an opportunity to contribute to its and the community's understanding of how to effectively meet the target population's complex needs. Although the organization served Medicaid recipients in the early 1990s, it mostly stopped doing so in 2003, primarily because of Colorado's low reimbursement rate, along with significant administrative challenges and burdens.⁴⁵ Since little was known about the standard of care for this population, the implementation of CRICC was used to help the health plan administrators think about the following questions: What is effective? How many times do you need to call a member? How do you manage certain situations and conditions? Although Kaiser Permanente CRICC leadership thought its integrated care among primary care providers, specialists, and behavioral health care providers worked well, the infrastructure was inadequate for addressing the nonclinical and social needs of the CRICC population. Therefore, the implementation of CRICC also helped the organization's leaders think about the nonclinical supports that the Medicaid population requires.

CRICC Contract Structure

Kaiser Permanente Colorado operated its CRICC program as an “administrative services only/primary care case management model” rather than as a standard managed care program. This means two things. First, because the program was not operated as a standard

⁴⁵Kaiser Permanente Colorado continued to serve the most vulnerable Medicaid clients, who they believed would have the most challenges seeking care in the community. Kaiser Permanente Colorado also continued to care for its own commercial members who lost employer-sponsored coverage and became eligible for Medicaid, to promote continuity of care. By 2011, over 50 percent of Kaiser Permanente Colorado's Medicaid members were children, and another large percentage (less than 25 percent) were adults receiving TANF, mainly pregnant women or women with children. The remaining members were receiving Medicaid through the Aged, Blind, and Disabled program, and some of them were eligible for CRICC. Kaiser Permanente Colorado wanted to learn more about how to effectively meet the needs of this growing population.

managed care program, Kaiser Permanente Colorado was reimbursed for all services that CRICC members received rather than reimbursed a fixed monthly fee to provide health care. One consequence of this structure was that CRICC members could receive specialty, emergency, and inpatient services from any provider who accepted Medicaid, as well as having access to Kaiser Permanente Colorado providers. CRICC members were required to use a Kaiser Permanente primary care provider, however. Second, being a primary care case management model meant that Kaiser Permanente Colorado received a \$20 fee from the state each month for each CRICC member to provide coordinated care services.⁴⁶ Because this fee did not cover all costs associated with providing enhanced coordinated care, Kaiser Permanente Colorado provided a significant investment to support the program.

Information Technology, Quality Assurance, Data

HealthConnect, Kaiser Permanente Colorado's electronic health record system, captured comprehensive health information for CRICC members for all the care that they received within the Kaiser Permanente Colorado system of care. All Kaiser Permanente Colorado health care professionals used and contributed to the system. The HealthConnect system also captured Kaiser Permanente Colorado pharmacy activity, radiology services, and lab work. In addition, hospitalists at core hospitals had access to the system and could add diagnostic and procedural information.⁴⁷ Although HealthConnect included a registry to indicate whether a member was in a hospital, it did not generate automatic alerts about admissions for the CRICC care team.

CRICC care managers also recorded information about each contact with a member and entered notes about the member in HealthConnect. The system used "smart sets," which is a queuing tool and charting template that prompted staff to discuss particular issues to help members avoid future hospitalizations. Members also had access to portions of their health records through a secure Kaiser Permanente Web site to see information about appointments and medical tests, and could securely e-mail their providers; however, many CRICC members did not have Internet access.

In 2011, Kaiser Permanente Colorado began developing HealthConnect to record information about nonclinical services that were provided to its members, such as housing search assistance, dental referrals, transportation supports, or any other service that CRICC members required. Kaiser Permanente Colorado was interested in analyzing this information to determine whether social service supports might be associated with specific health outcomes.

⁴⁶Colorado Access, under its contract with HCPF, received a fee of \$32 per member per month. In a similar chronic care management pilot in New York, programs received a monthly care coordination fee ranging from \$205.00 to \$308.33 per member.

⁴⁷A "hospitalist" is a physician who focuses primarily on general medical care of hospitalized patients. (See www.hospitalmedicine.org.)

Staffing and Structure

CRICC staff included four full-time care managers — two registered nurses (RNs) and two social workers — and two nonclinical community specialists who assisted the care managers and worked with CRICC members, as described in more detail below.⁴⁸ Collectively, the six CRICC staff formed the “care team.” Members were assigned to care managers based on their primary needs; someone with primarily behavioral health issues was assigned to a social worker while someone with primarily medical issues was assigned to a nurse.

Although each CRICC member had a primary care manager, care managers advised one another when needed and picked up one another’s cases when necessary. When interviewed as a group, the care team demonstrated knowledge about one another’s cases and provided many examples of how the team worked together to achieve results for members.

Care managers had considerable experience providing related services. Before joining the CRICC team, both nurses had at least five years’ experience with Kaiser Permanente Colorado’s existing coordinated care program for individuals with chronic conditions. The social workers were licensed clinical social workers (LCSWs), also with years of experience with similar populations before working with CRICC.⁴⁹

Care managers had a caseload of about 130 members each, which is higher than the median caseload of 70 reported in the Medicare Coordinated Care Demonstration. The staff each worked out of a different Kaiser Permanente Colorado clinic (among 26 Kaiser Permanente medical offices in the Denver area), but communicated regularly by instant messaging, e-mail, or telephone.

While Kaiser Permanente Colorado had care managers in place for other member populations such as Medicare recipients, the community specialists were unique to CRICC. One community specialist was an entry-level social worker and the other had a business background, although both had years of other experience. Their primary responsibility was to support the care managers by addressing nonclinical issues. The community specialists’ goal was to educate members on how to access resources such as rental, food, or dental assistance. In that role, they became experts on the resources that were available within the community and the funding streams of community agencies. For example, the community specialists learned when each agency received new funds, and made strategic calls at these times on behalf of members. They

⁴⁸During much of the implementation period the team was short one social worker. There was also a series of social worker interns who were supervised by a social worker care manager. These interns relieved some of the nonclinical workload from the community specialists and had small caseloads of their own, under the social worker care manager’s direction.

⁴⁹Although the social workers were licensed, the program model did not intend for them to diagnose mental illness like a treating clinician.

also became experts in filling out requests or applications for financial support. Community specialists also helped to resolve billing problems.

Although the care managers had experience with populations that were similar to those in CRICC, they needed to learn a lot in order to serve the CRICC population fully. Staff were not experts in the intricacies of the Medicaid system, so they had to train themselves and learn how different government systems function. Many CRICC members had developmental disabilities, which required staff to become familiar with the state systems for that population. Furthermore, not all pharmacies accept Medicaid. Although the care team encouraged CRICC members to use Kaiser Permanente Colorado pharmacies, staff had to learn the best ways for members to fill prescriptions from other pharmacies.

Aside from having experience with similar populations, program leadership believed that personalities of the care team were extremely important to its success. The ideal team member was described as being passionate about making a difference; having patience, tolerance, and empathy; being a high achiever; having a “Type A” personality; and caring about the target population. The downside of these characteristics was the lack of boundaries that care managers set with their members, creating concerns about staff burnout as a result.

Although the care team worked rather autonomously, as is standard for Kaiser Permanente Colorado, they were supervised by a nurse (in addition to the two RNs mentioned earlier). This position experienced a great deal of turnover throughout the duration of the program, which is common at Kaiser Permanente Colorado,⁵⁰ but was trying for the care team. With each turnover, for example, the care team had to take time to review their processes with the new supervisor. Supervisors also differed in their expectations. For example, the care team thought one supervisor had unrealistic expectations, which they found stressful, although the next supervisor agreed with the care team’s assessment and changed some policies. The supervisor was also expected to have a three-hour meeting with the care team every two weeks; one supervisor used this time to emphasize the program’s vision rather than micromanaging cases, as previous supervisors had done. The care team appreciated this supervisor’s broader approach, which was informed by a background in coordinated care, business, Medicaid, and Medicare.

Missing from the supervisory system were clear benchmarks and guidelines to ensure standardization across care managers and community specialists. For example, each care manager followed a different process for conducting chart reviews, and the expectations for chart reviews changed with each supervisor. The expectations around frequency of contact with plan members were also open to interpretation. Care managers were also unsure what to do with

⁵⁰Personal communication between MDRC staff and Sheri Filak-Taylor, part of CRICC leadership at Kaiser Permanente.

members who were approaching their one-year anniversary with CRICC. Typical Kaiser Permanente Colorado members are prompted to get their annual physical, but specific guidelines for CRICC members were never set. Care managers were expected to reassess a member if the level of care changed — because of a hospital stay, for example — but otherwise care plans were based on the individualized needs of the patient.

Program Intervention

Kaiser Permanente Colorado's CRICC program was a more intensive version of its existing coordinated care services for other membership populations, with a greater focus on social and nonclinical service delivery than it offers as part of its standard services. The Kaiser Permanente CRICC model was informed by early implementation of Colorado Access's CRICC program, other Kaiser Permanente Medicaid Learning Initiative projects, individuals from Kaiser Permanente Colorado's Institute of Health Research group, and outside experts (for example, CHCS and a consultant with expertise in chronic care programs).

Although coordinated care was provided primarily by telephone, care managers sometimes met members in person, which was facilitated by having care team members in Kaiser Permanente Colorado's clinics. The care team had difficulty connecting with members and keeping them engaged. The team described their efforts to contact some members multiple times over many months through a variety of means. The care managers also described the population as one that was challenging to keep healthy. Nevertheless, there were many examples of positive achievements by members who were engaged with CRICC and for whom the care team helped to develop self-advocacy skills. One member told the evaluation team how much more empowered she became after working with her care manager; likewise, the care manager noted the member's increased control over her life. Additional member stories appear later in this section.

Assessment and Care Planning

As explained earlier, before being assigned a care manager, new members to CRICC were administered a triage questionnaire by a community specialist or IVR. The triage questionnaire consisted of 10 questions taken from validated tools that asked respondents to rate their health, report whether they had been recently hospitalized or visited the emergency department, and report whether they were able to care for themselves by taking medication or getting to appointments. Members scored a point for each question they answered in the affirmative.

Kaiser Permanente Colorado originally planned to use the triage questionnaire to place CRICC members into two risk groups. Members who answered in the affirmative to at least two questions were categorized as high risk, as were those who rated their health as poor, who were

hospitalized in the last year, or who had been to the emergency department in the last three months. High-risk individuals would be eligible for Kaiser Permanente CRICC coordinated care services while others would get Kaiser Permanente Colorado's standard coordinated care services. A member's risk would be reassessed after a hospitalization to determine whether a move into CRICC from standard coordinated care was advisable. Low-risk members were to receive monthly follow-up for three months. If the member was stable, then contact was shifted to quarterly with a monthly chart review. Meanwhile, the minimum contact for high-risk members was a monthly call, although some received a daily or weekly call. Typically there was to be frequent contact during the first three months of treatment and less frequent contact after that, as determined by the member's needs.

In practice, however, the care team did not use the risk-scoring system as a means to determine level of contact, although it may have been used to determine the urgency of initial outreach. Instead, consistent with Kaiser Permanente Colorado's coordinated care philosophy, the care manager could use her clinical judgment to determine the level of attention a person required. The member's desire to be involved in coordinated care also influenced the extent of contact. As a result, members were typically contacted more regularly than the loosely established expectations of monthly or quarterly contact.

After responding to the triage questions, a member's information was placed in a CRICC program admissions "in-box," which was accessed electronically by the whole care team. The care managers divided up the cases in the in-box and worked with those who had the most pressing needs first (who are not necessarily the highest-risk individuals). As noted earlier, members with primarily behavioral health concerns were paired with a social worker, while those with primarily medical concerns were paired with a nurse.

The care managers attempted to make contact with new members to conduct a more detailed clinical assessment within 24 to 48 hours after the member completed the triage questionnaire. The clinical assessments covered a wide range of information: physical health, behavioral health, medications taken, medical history, and diagnoses, among other topics. It took at least one hour to complete. If a member reported using five or more prescriptions, then the Kaiser Permanente Colorado pharmacy reviewed each prescription to ensure that it was appropriately prescribed and not contraindicated. Members were reassessed after each hospitalization; otherwise, reassessments were done at least annually. There was no systematic process for reassessing members after emergency department visits.

Although many new members had been recently reached by the community specialist or IVR to complete the triage questionnaire, care managers often had a difficult time reaching them for the assessment if, for example, their phone was disconnected, they did not answer, or they did not call the care manager back. After several attempts at making contact, the care

manager sent a letter to any member whom they could not reach. Care managers made electronic reminders to themselves to check on the individual the next week; they then made biweekly attempts to contact the individual. According to the care team, they never completely stopped trying to engage a member. Read Amanda's story in Box 1 for one example of the challenges that the care team experienced when trying to engage members.

Care Plan

Although the phrase "care plan" suggests a single document containing information about a member and goals of treatment, one specific care plan for each member could not typically be found in one place in the Kaiser Permanente Colorado electronic medical record system. Instead, a user had to navigate through many different screens to find a member's medical history or condition, a psychosocial description, functional status, list of supports required, and the member's goals for care.

The care plan had to be developed within 90 days of the member's activation in the Kaiser Permanente CRICC program. The care manager typically developed the plan after the new member's first appointment with a primary care provider but before the second contact between the member and the care manager. The care plan was based on information from the member, assessments, and medical charts. In addition, care managers estimated that approximately 50 percent of the members with primarily social or mental concerns had input from others in their lives, as did 25 percent of those with primarily medical conditions. Care plans were available for review by the member, providers, or a HIPAA-authorized party (such as a family member or other providers), although members may not have known that a plan had been developed. Care plans were revised as needed and formally reviewed annually. The care managers referred to the care plan during every contact as a means to monitor progress; however, the plan was not necessarily revised each time. Clinical notes relating to each contact were documented in the patient's electronic medical record.

The patient population, according to the care managers, seemed to have more substance abuse problems than the general population with whom they were used to working; a majority of the abuse was of prescription medications. Many members were eager to get prescriptions for pain medication refilled. One tool for addressing substance abuse was to create a "narcotic

Box 1

Amanda's Story — Hard to Serve, Noncompliant

Amanda was 36 years of age at the time of random assignment. Upon enrollment in Kaiser Permanente Colorado, she had a long list of chronic medical issues, including nausea and vomiting, asthma, fibromyalgia, anemia, and many others. She also had a record of depression, opioid dependence, and drug-seeking behavior. Between December 2009 and May 2010, Amanda had 12 hospitalizations or emergency department visits, primarily because of abdominal pain.

Amanda was very difficult to engage. The community specialist could not reach her to complete an assessment. A CRICC nurse was able to meet Amanda in person, but only because she was hospitalized in a Kaiser Permanente Colorado core hospital and the attending physician requested the nurse's presence. Based on this first meeting, the CRICC nurse developed a care plan, which included the following goals: having an annual physical, getting yearly vision screening, and contacting a behavioral health provider for treatment of post-traumatic stress disorder. One barrier that was listed was transportation, so the nurse provided information about resources for Amanda to use. The nurse set a follow-up date for one week later.

Despite numerous attempts to reach Amanda after she was discharged from the hospital, the CRICC nurse succeeded in contacting her only twice in five months. Amanda was not compliant with follow-up visits to the CRICC nurse or to her primary care provider. She missed several PCP appointments, refused to schedule an appointment with a gastrointestinal specialist, and did not follow through with all ordered labs and procedures. Rather than seeking appropriate treatment, Amanda continued to visit the emergency department when her condition worsened. After numerous calls to Amanda without any response, the CRICC nurse sent a certified letter to her in a continued effort to make contact.

The CRICC nurse even sought her fellow social worker's help in engaging Amanda. The nurse and the social worker then worked with behavioral services staff at the hospital to get a psychiatric evaluation for Amanda during one of her hospital stays, but the attending physician denied the request.

contract" in conjunction with the care plan. The contract was developed between the primary care provider and the member. It stipulated when a prescription was eligible to be filled. The contract was shared with other providers and emergency departments as appropriate to limit a drug-seeking patient's ability to shop around for multiple prescriptions. The care team also reported patients whom they suspected of abusing prescription medications to the state's client

over-utilization program, which reviews client utilization profiles to identify and change excessive patterns of use by clients and providers.⁵¹

Care Coordination and Physician Engagement

Care coordination included helping members gain access to health care providers, helping providers get additional needed information about patients, and helping members with social service needs.

One early step was for new members to have a physical with a Kaiser Permanente Colorado primary care provider who was assigned based on geography for patients who did not select their own PCP. This appointment ideally occurred within 30 days of first contact with the care managers. Members could easily change PCPs if desired, and this was often facilitated by the care team, using biographic information about possible providers to help members make an educated decision. The CRICC program model allowed for the first meeting with a PCP to take 40 minutes, twice the time allotted for standard appointments, which allowed physicians to take their time with new members. Sometimes care managers also attended this appointment. Greta's story, in Box 2, illustrates how vital the Kaiser Permanente Colorado PCP connection was to the coordinated care process.

Through the HealthConnect system, care managers viewed physicians' notes from each appointment and followed up with the members to make sure they followed through. Likewise, the physicians had access to the CRICC care plans and contact notes. The care managers and doctors could also use the system to communicate about specific members. For example, if a care manager had a difficult time reaching a member, she indicated this in the electronic record and the member's doctor helped make that connection in a future appointment. Similarly, doctors asked care managers to attend upcoming appointments when needed.

Care managers reported that doctors with Kaiser Permanente Colorado appreciated the additional support for these complex patients. The study team met with one Kaiser Permanente Colorado doctor who had many Medicaid patients on her panel. This doctor spoke of the benefits of a coordinated care model, including having the involvement of a care manager to follow up with her patients after appointments, which enabled the doctor to make more progress in patient care. As a means to further patient progress, some doctors allowed the clinical CRICC staff to order basic laboratory tests before the member attended her first PCP appointment. Care managers also checked for preventive care needs, such as mammograms or colonoscopies, and

⁵¹See www.colorado.gov.

Box 2

Greta's Story — Multiple Needs and the Patient's Idea of Health

When the study began, Greta was a 47-year-old single mother. She was enrolled in CRICC in September 2009. Greta completed her health risk assessment right away. The assessment revealed that she was a paraplegic as the result of injuries that she had sustained in a motor vehicle accident 25 years earlier. Though she rated herself as having “excellent” health, she had an open infected wound on her buttocks that required immediate attention. Greta saw her newly assigned primary care provider four days after enrollment in the CRICC program; the PCP referred her immediately to Kaiser Permanente Colorado’s specialized wound care clinic, which she visited the following week. She was then referred to Kaiser Permanente Colorado’s plastic surgery department for a next-day appointment. About a month later, the physiatry department assessed her need for a power wheelchair. Greta’s CRICC nurse also arranged for her to get immediate home care for her wound.

The wound care and plastic surgery departments followed Greta for the next several months while the infection subsided and the wound was surgically closed. Greta was transferred to an acute care specialty hospital for inpatient rehabilitation for about two months, during which time she was monitored by a Kaiser Permanente Colorado care manager (charged with monitoring members in skilled nursing, long term care, or assisted-living facilities). While Greta was rehabilitating, she and her children were evicted from their home and became homeless. A CRICC community specialist and a social work intern worked with Greta to identify new housing. After settling in permanent housing with her children, Greta’s goals were to maintain independence and to have no further infections. At last account, she was complying with PCP visits and her rehabilitation schedule.

ordered tests or suggested that the physician order preventive tests. Additionally, the CRICC members often missed their appointments, so care managers also tried to get them to improve their attendance.

Aside from access to Kaiser Permanente Colorado’s primary and specialty physicians, CRICC members also accessed other Kaiser Permanente Colorado programs. For example, members who made a lot of emergency department visits could be placed in the Kaiser Permanente Colorado “Frequent Flyer” program, which meant that staff outside the CRICC program would contact them to address their frequent (and often inappropriate) emergency department visits. CRICC also developed a partnership with the Kaiser Permanente Colorado Medical Financial Assistance program, which paid for certain expenses for any member who qualified. This entity paid for CRICC members to participate in the Optifast[®] weight loss program or any other health education class that was available.

Overall, the care managers' philosophy was to meet members on their own terms. The care team recognized that they could not work with individuals who were not interested in being involved in improving their own health, and that patient "activation" — that is, having the knowledge, skill, and confidence to manage one's health — was important to gauge in their members, although there was no formal method of doing so. Patients with more activation tend to have better health-related outcomes.⁵² The staff learned to gauge personality and character to figure out what motivated members to make life changes. For example, letting members direct and participate in decision-making about their own care often generated greater cooperation. The care managers were also trained in and used motivational interviewing with members.⁵³ Fostering members' independence was important when trying to encourage behavioral change, so the care manager or community specialist was careful not to do all the work for members and discouraged them from relying too heavily on the care team. The care team noted the importance of being patient and persistent with their members throughout this process. Sometimes it took months to build the trust of a new member, and the member sometimes trusted the care team to help with problems only after seeing how the care team helped with a particular issue.

As noted above, care coordination was based primarily on the members' self-reported assessment, in part because other data were not readily available. For example, Kaiser Permanente Colorado received Medicaid claims data for its members from the state, but it took one to three months to receive the data. Since the data made up a key source of information on the use of providers outside Kaiser Permanente Colorado, the delay was typically too long to be useful for planning coordinated care. More immediate information could have helped the care team confirm diagnoses or attendance at appointments, or uncovered treatment information that the member had not disclosed previously. The claims data also did not include behavioral health claims, which are covered through the carve-out described earlier, and are subject to additional restricted access under Colorado state law.

Another challenge to care coordination was the ability of CRICC members to see providers outside the Kaiser Permanente Colorado network. Connecting with these providers, particularly with behavioral health providers, was more challenging. For specific patients, care managers had good relationships with behavioral health providers at Jefferson County Mental Health. For example, a treating provider would fax the care manager the mental health care plan. However, CRICC care managers did not get preferential treatment for their members; it took up to six weeks to get an appointment. In emergencies, the care managers intervened to get stabilizing medication until the member was properly treated.

⁵²Greene and Hibbard (2012).

⁵³Motivational interviewing is a "directive, client-centred counselling [*sic*] style for eliciting behavior change by helping clients to explore and resolve ambivalence" (Miller and Rollnick, 1991).

Arranging Access to Services and Resources

Although health care was the focus of the CRICC program, the care managers noted that a member's basic human needs often had to be addressed before they could begin to think about medical care. As a result, coordinated care frequently began by addressing nonclinical needs. Housing and eviction assistance, utilities assistance, food resources, transportation, dental care, vision care, hearing aids, accessible communication technology, homemaker services, respite care, long term care, military family support, or reentry services after prison release were all common resources that members needed.

When a care manager identified a social service need, she typically asked the community specialist to assist the member, although sometimes the care manager arranged for nonclinical resources herself. Over time, the care team found that primary care providers and other staff within Kaiser Permanente Colorado also referred CRICC members to the community specialists for specific help, as the community specialists were seen as the experts in providing nonclinical supports. The care team referred members to specific community resources by providing lists of possible contacts or suggesting whom to call, taught members how to request services, and actively helped arrange for resources. For example, the community specialists coached clients on what to say and how to ask for particular resources and prepared them for what to expect from the discussions with community service providers. The care team also coached members through the process of requesting mental health counseling and other specialty medical services. Members often procrastinated making calls for themselves, so the care team put deadlines on specific tasks, such as calling to make a dental appointment. They also helped clients fill out applications for financial or other assistance.

In conjunction with arranging for needed resources, staff advocated on behalf of their members and taught members how to advocate for themselves independently. For example, one nurse made phone calls on behalf of an asthmatic member to get durable medical equipment at a discounted price so that the member could better manage her condition. In another example, a community specialist helped a deaf member who could not type or spell: instead of TTY, she arranged for the member to get video phone, which required some negotiation between the phone provider and the landlord.

Community specialists were also active in the community to develop new relationships with service providers. They spent a lot of time learning about the different resources that were available and introducing themselves and the program to various organizations. The community specialists met with each other several times a month to discuss resources and availability of supports. They developed a spreadsheet of all the available resources that others within Kaiser Permanente Colorado also used.

Patient Education

As the care team coordinated medical and other services and arranged for members to get resources, they also engaged members in patient education activities. Patient education often started with reference to the Kaiser Permanente Web site for those members who had access. The Web site includes many resources for all members, including answers to frequently asked questions. When members did not have Internet access, care managers printed out information from the Web site for them or acquired brochures or handouts from providers to send to them. Frequently, members needed information about diabetes, so the care managers sent information about telephone information lines and classes that were available at Kaiser Permanente Colorado or in the community.

Transitional Care

A successful transition back into the home after being hospitalized has been identified as critical to reducing rehospitalization in a number of studies.⁵⁴ Obtaining information about hospitalized CRICC members was a challenge, however, particularly from hospitals where Kaiser Permanente Colorado staff did not work. The care team found it hard to coordinate a member's care without having access to hospital records, treatment information, and knowledge of a member's admission date — information that could not be readily obtained from non-core hospitals. Therefore, assuring a smooth transition was very time-consuming for the CRICC care managers, as the responsiveness of staff at various facilities varied.

Transitions for members who were hospitalized in a core hospital were much easier than for those who were hospitalized or treated elsewhere. Quality Resource Coordinators (Kaiser Permanente Colorado employees within core hospitals) help patients with discharge, making the transition home, and connecting back to Kaiser Permanente Colorado physicians after a hospitalization. Kaiser Permanente Colorado Quality Resource Coordinators communicated with and left voicemails on the CRICC phone line about CRICC clients in the core hospitals. Although the care managers tried to develop relationships with similar discharge staff at other hospitals, they typically were not able to get the information they desired. Community specialists often helped care managers to prepare for a member's hospital discharge. The specialist worked with a member to sort out billing problems or questions while the care manager juggled calls with doctors and nurses and arranged for prescriptions and instructions to facilitate discharge.

⁵⁴Kane (2009); McCarthy, Cohen, and Johnson (2013).

Estimated Effects of the Kaiser Permanente CRICC Program

This section presents the estimated effects of the Kaiser Permanente CRICC program on outpatient visits, hospital admissions, emergency department use, and use of prescription medications through the two years after the month of passive enrollment. As noted earlier, information was not available about the effects of the program on social service use, health outcomes, quality of care, or most behavioral health care, all of which may have been influenced by either managed care or care coordination.

Results are shown separately for each year because the effects of the program were expected to change over time. In particular, coordinated care was expected to increase health care use in the short term as care managers connected patients with primary care providers and possibly uncovered unmet health care needs. Because Kaiser Permanente Colorado intended for primary care providers to be medical “homes” for CRICC members — that is, able to provide care at any time — this effort might also have reduced emergency department visits in the short term. These early efforts as well as efforts by care managers to help members with their social service needs may have improved health and resulted in fewer hospital admissions, although this effect was not expected until later in the program.

Three sets of results are shown. The first compares outcomes for the entire program and control groups, which represent the average effects of being passively enrolled into managed care. If Kaiser Permanente CRICC coordinated care had a substantial effect on those who received it, that effect will show up in this set of results. The second set of results is for the high-needs subgroup, who were thought to be most likely to benefit from coordinated care. The third set of results shows the estimated effects for a subgroup that was less likely to opt out of the Kaiser Permanente CRICC program for another managed care plan or to remain in fee-for-service Medicaid — that is, those who were predicted to enroll in the program, referred to here as the “high-participation” subgroup. While only about half of the full program group was enrolled in the Kaiser Permanente Colorado system, about two-thirds of this high-participation program subgroup was enrolled in it. By focusing on a subgroup who were more likely to have enrolled in the CRICC program, these results come closer to providing estimates of the program itself (rather than the effects of being passively enrolled).

Effects for the Full Sample

Outpatient Services

Table 4 shows the estimated effects of the program on outpatient visits, including primary care (all types and wellness visits only⁵⁵), nonphysician visits, and specialist visits. Results

⁵⁵As shown in the appendix to this report, wellness visits have a Current Procedural Terminology (CPT) (continued)

are shown for each year following passive enrollment and for the full two-year period. For each time period, the table shows both the proportion of individuals who made any visit and the average number of visits (expressed as the number of visits per 1,000 sample members in a month). In addition, the table shows outcome levels for the program group and control group, with estimated impacts calculated as the difference between the two.

As noted earlier, the first goal of both the managed care program and the enhanced coordinated care program was to increase the use of primary care. Table 4 does not indicate large differences between the program and control groups on primary care visits, however. Over the course of the two years, for example, more than 70 percent of both groups saw a primary care provider at least once.⁵⁶ The frequent use of primary care may reflect the nature of the study participants, all of whom had disabilities that might have warranted ongoing care. Because most individuals used primary care even without the intervention, there was somewhat limited room for the program to make a difference.

Despite the lack of an effect on PCP visits, the program did appear to increase the use of specialist visits and nonphysician visits. In particular, more program group members than control group members visited a nonphysician health care provider in each year of follow-up, with these effects primarily reflecting increased visits to optometrists and physical therapists (not shown in the table). An increase in nonphysician visits was also one of the few statistically significant findings from the Colorado Access pilot,⁵⁷ perhaps adding some additional credibility to this result.

Table 4 also shows that more program group members than control group members visited a specialist in each year of follow-up. Among specialists, there was an increase especially in care provided by radiologists in the first year (from about 41 percent of the control group to 46 percent of the program group), but also an increase across a broad range of other types of specialists (not shown). The combination of findings might indicate that PCPs or care managers uncovered a need for specialty care rather than primary care, or simply that CRICC members enjoyed easier access to specialists because they could use any provider in the Kaiser Permanente Colorado system.

code of 99201-99205 or 99211-99215.

⁵⁶The drop in health care use between Year 1 and Year 2 is one consequence of the intent-to-treat method. In particular, individuals were included in the calculation even if they no longer remained on Medicaid. If they left Medicaid, they were recorded as having made no doctor's visits that were reimbursed by Medicaid.

⁵⁷Michalopoulos, Manno, Kim, and Warren (2013).

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Table 4

Estimated Impacts of CRICC Pilot on Use of Outpatient Services

| Outcome | Program Group | Control Group | Difference (Impact) |
|---|---------------|---------------|---------------------|
| <u>Months 1-12 after month of passive enrollment</u> | | | |
| Any type of visit with a primary care provider (PCP) (%) | 65.5 | 62.7 | 2.8 |
| Wellness visit (%) | 52.8 | 52.5 | 0.3 |
| Nonphysician visit (%) | 15.8 | 12.8 | 3.0 ** |
| Specialist visit (%) | 64.3 | 57.9 | 6.4 *** |
| Average number of PCP visits per 1,000 client months | 398 | 382 | 16 |
| Wellness visits | 210 | 210 | 0 |
| Average number of nonphysician visits per 1,000 client months | 68 | 60 | 8 |
| Average number of specialist visits per 1,000 client months | 669 | 592 | 77 |
| <u>Months 13-24 after month of passive enrollment</u> | | | |
| Any type of visit with a PCP (%) | 57.2 | 57.9 | -0.7 |
| Wellness visit (%) | 47.2 | 50.3 | -3.0 |
| Nonphysician visit (%) | 14.5 | 12.4 | 2.1 |
| Specialist visit (%) | 57.7 | 53.2 | 4.6 ** |
| Average number of PCP visits per 1,000 client months | 296 | 335 | -39 * |
| Wellness visits | 170 | 184 | -13 |
| Average number of nonphysician visits per 1,000 client months | 49 | 54 | -5 |
| Average number of specialist visits per 1,000 client months | 515 | 509 | 6 |
| <u>Months 1-24 after month of passive enrollment</u> | | | |
| Any type of visit with a PCP (%) | 73.7 | 71.0 | 2.7 |
| Wellness visit (%) | 62.6 | 61.4 | 1.1 |
| Nonphysician visit (%) | 23.3 | 19.9 | 3.4 ** |
| Specialist visit (%) | 72.0 | 68.4 | 3.6 ** |
| Average number of PCP visits per 1,000 client months | 347 | 359 | -11 |
| Wellness visits | 190 | 197 | -7 |
| Average number of nonphysician visits per 1,000 client months | 58 | 57 | 1 |
| Average number of specialist visits per 1,000 client months | 592 | 551 | 41 |
| Sample size (total = 2,618) | 1,831 | 787 | |

SOURCE: MDRC calculations based on Medicaid claims data from the Colorado Department of Health Care Policy and Financing.

NOTE: A two-tailed t-test was applied to differences between the outcomes for the program and control groups. Statistical significance levels are indicated as follows: *** = 1 percent, ** = 5 percent, * = 10 percent.

Hospital Admissions and Emergency Department Visits

Table 5 shows the estimated effects on hospital admissions and ED use. Outcomes related to hospital admissions include percentage hospitalized, average number of hospital admissions per 1,000 client months, percentage readmitted to the hospital within 30 days, and average number of inpatient days per 1,000 client months. Outcomes related to ED use include percentage who used the ED and number of ED visits per 1,000 client months. Once again, results are presented for each year following passive enrollment and the full two-year follow-up period. Since reductions in hospital admissions and ED use might take some time to develop, impacts might have been larger later in the follow-up period.

There is little evidence that the program affected hospital admissions and ED use for the full sample: only one of the estimated effects is significantly different from zero. In particular, fewer program group members used the ED in Year 2 than did control group members. Although this effect is consistent with the program's goals, it is common to see one significant impact estimate in a table like this when the program had no real effect. In addition, a further analysis did not indicate that this reduction in ED visits stemmed from conditions that could have been treated through primary care. It is therefore difficult to conclude from these results that the Kaiser Permanente RICC program reduced either hospital admissions or ED use.

Prescription Medications

Table 6 shows the estimated effects on the percentage of individuals who filled a prescription medication and the number of prescriptions filled per 1,000 sample members in a month. Although there is interest in knowing whether individuals are filling appropriate prescriptions for the conditions they have been diagnosed with, it was expected that care managers would monitor the use of prescription medications and help ensure that individuals were refilling prescriptions as needed.

Despite this expectation, there is little evidence that the Kaiser Permanente CRICC program affected the filling of prescription medications. For example, in the first year following the month of passive enrollment, 74.1 percent of the program group and 72.3 percent of the control group filled at least one prescription, and about 3,000 prescriptions were filled per 1,000 client months for each group. It is possible, of course, that care managers helped individuals receive and adhere to an appropriate set of prescriptions, which may have resulted in additional prescriptions filled for some people but a reduction in filled prescriptions for others. It is difficult to assess this possibility for a diverse population such as the one in this study.

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Table 5

**Estimated Impacts of CRICC Pilot on Hospital Admissions and
Emergency Department Use**

| Outcome | Program Group | Control Group | Difference (Impact) |
|--|---------------|---------------|---------------------|
| <u>Months 1-12 after month of passive enrollment</u> | | | |
| Ever admitted to a hospital (%) | 14.8 | 15.8 | -1.0 |
| Readmitted within 30 days (%) | 3.4 | 2.5 | 0.9 |
| Ever used an emergency department (ED) (%) | 40.2 | 38.5 | 1.7 |
| Average number of admissions per 1,000 client months | 23 | 24 | -1 |
| Average number of inpatient days per 1,000 client months | 165 | 146 | 19 |
| Average number of ED visits per 1,000 client months | 121 | 115 | 6 |
| <u>Months 13-24 after month of passive enrollment</u> | | | |
| Ever admitted to a hospital (%) | 12.1 | 13.3 | -1.2 |
| Readmitted within 30 days (%) | 2.5 | 2.5 | -0.1 |
| Ever used an ED (%) | 35.9 | 39.5 | -3.6 * |
| Average number of admissions per 1,000 client months | 18 | 20 | -2 |
| Average number of inpatient days per 1,000 client months | 134 | 106 | 28 |
| Average number of ED visits per 1,000 client months | 107 | 100 | 8 |
| <u>Months 1-24 after month of passive enrollment</u> | | | |
| Ever admitted to a hospital (%) | 21.7 | 23.4 | -1.7 |
| Readmitted within 30 days (%) | 5.4 | 4.4 | 1.0 |
| Ever used an ED (%) | 51.5 | 53.4 | -2.0 |
| Average number of admissions per 1,000 client months | 20 | 22 | -1 |
| Average number of inpatient days per 1,000 client months | 149 | 126 | 23 |
| Average number of ED visits per 1,000 client months | 114 | 107 | 7 |
| Sample size (total = 2,618) | 1,831 | 787 | |

SOURCE: MDRC calculations based on Medicaid claims data from the Colorado Department of Health Care Policy and Financing.

NOTE: A two-tailed t-test was applied to differences between the outcomes for the program and control groups. Statistical significance levels are indicated as follows: *** = 1 percent, ** = 5 percent, * = 10 percent.

Effects for the High-Needs Subgroup

Tables 7 through 9 show estimated effects for the 20 percent of health care users who were considered to have the highest needs. Most individuals in this group had multiple chronic conditions and they were at greatest risk of having fragmented standard care in the fee-for-service system, particularly if they were not using a primary care provider. As a result, the

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Table 6

Estimated Impacts of CRICC Pilot on Filling Prescription Medications

| Outcome | Program Group | Control Group | Difference (Impact) |
|---|---------------|---------------|---------------------|
| <u>Months 1-12 after month of passive enrollment</u> | | | |
| Filled any prescription medication (%) | 74.1 | 72.3 | 1.8 |
| Average number of prescription medications filled per 1,000 client months | 2,964 | 3,164 | -200 * |
| <u>Months 13-24 after month of passive enrollment</u> | | | |
| Filled any prescription medication (%) | 64.0 | 61.1 | 2.9 |
| Average number of prescription medications filled per 1,000 client months | 2,504 | 2,636 | -132 |
| <u>Months 1-24 after month of passive enrollment</u> | | | |
| Filled any prescription medication (%) | 77.5 | 75.3 | 2.2 |
| Average number of prescription medications filled per 1,000 client months | 2,734 | 2,900 | -166 |
| Sample size (total = 2,618) | 1,831 | 787 | |

SOURCE: MDRC calculations based on Medicaid claims data from the Colorado Department of Health Care Policy and Financing.

NOTE: A two-tailed t-test was applied to differences between the outcomes for the program and control groups. Statistical significance levels are indicated as follows: *** = 1 percent, ** = 5 percent, * = 10 percent.

effects of coordinated care were hypothesized to be the greatest for this group. It is possible, however, that these high-needs users are so sick that coordinated care cannot reduce their health care use. In addition, because this group represents only 20 percent of the study sample, any effects would have to be large to be considered statistically significant.

As expected, this group uses much more care than the full sample. For example, they made about 50 percent more visits to PCPs (589 per month per 1,000 individuals compared with 398 for the full program group in the first year) and about 30 percent more visits to specialists (844 compared with 669).

In terms of the program's effects, the results were similar to results for the full sample, but generally larger for this subgroup. For example, similar to the full sample, high-needs program group members were more likely to see a nonphysician provider in the first year and specialists in both years compared with the high-needs control group. However, the estimated

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Table 7

**Estimated Impacts of CRICC Pilot on Use of Outpatient Services,
High-Needs Subgroup**

| Outcome | Program Group | Control Group | Difference (Impact) |
|---|---------------|---------------|---------------------|
| <u>Months 1-12 after month of passive enrollment</u> | | | |
| Any type of visit with a primary care provider (PCP) (%) | 76.3 | 75.9 | 0.4 |
| Wellness visit (%) | 63.2 | 65.6 | -2.4 |
| Nonphysician visit (%) | 26.9 | 19.0 | 7.9 ** |
| Specialist visit (%) | 77.2 | 71.9 | 5.4 |
| Average number of PCP visits per 1,000 client months | 589 | 500 | 88 |
| Wellness visits | 286 | 277 | 9 |
| Average number of nonphysician visits per 1,000 client months | 129 | 117 | 13 |
| Average number of specialist visits per 1,000 client months | 844 | 763 | 81 |
| <u>Months 13-24 after month of passive enrollment</u> | | | |
| Any type of visit with a PCP (%) | 71.1 | 69.0 | 2.1 |
| Wellness visit (%) | 59.0 | 59.5 | -0.4 |
| Nonphysician visit (%) | 20.0 | 23.3 | -3.3 |
| Specialist visit (%) | 74.1 | 63.6 | 10.5 ** |
| Average number of PCP visits per 1,000 client months | 456 | 487 | -31 |
| Wellness visits | 256 | 250 | 5 |
| Average number of nonphysician visits per 1,000 client months | 89 | 94 | -5 |
| Average number of specialist visits per 1,000 client months | 669 | 624 | 45 |
| <u>Months 1-24 after month of passive enrollment</u> | | | |
| Any type of visit with a PCP (%) | 83.9 | 82.3 | 1.6 |
| Wellness visit (%) | 72.7 | 73.4 | -0.7 |
| Nonphysician visit (%) | 34.9 | 30.7 | 4.2 |
| Specialist visit (%) | 85.2 | 79.9 | 5.3 |
| Average number of PCP visits per 1,000 client months | 522 | 494 | 28 |
| Wellness visits | 271 | 264 | 7 |
| Average number of nonphysician visits per 1,000 client months | 109 | 105 | 4 |
| Average number of specialist visits per 1,000 client months | 756 | 694 | 63 |
| Sample size (total = 524) | 361 | 163 | |

SOURCE: MDRC calculations based on Medicaid claims data from the Colorado Department of Health Care Policy and Financing.

NOTE: A two-tailed t-test was applied to differences between the outcomes for the program and control groups. Statistical significance levels are indicated as follows: *** = 1 percent, ** = 5 percent, * = 10 percent.

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Table 8

**Estimated Impacts of CRICC Pilot on Hospital Admissions and
Emergency Department Use, High-Needs Subgroup**

| Outcome | Program Group | Control Group | Difference (Impact) |
|--|---------------|---------------|---------------------|
| <u>Months 1-12 after month of passive enrollment</u> | | | |
| Ever admitted to a hospital (%) | 20.6 | 18.2 | 2.4 |
| Readmitted within 30 days (%) | 6.9 | 1.9 | 5.1 ** |
| Ever used an emergency department (ED) (%) | 52.9 | 49.2 | 3.7 |
| Average number of admissions per 1,000 client months | 36 | 33 | 3 |
| Average number of inpatient days per 1,000 client months | 288 | 163 | 125 |
| Average number of ED visits per 1,000 client months | 199 | 164 | 35 |
| <u>Months 13-24 after month of passive enrollment</u> | | | |
| Ever admitted to a hospital (%) | 18.0 | 17.2 | 0.7 |
| Readmitted within 30 days (%) | 2.6 | 2.8 | -0.2 |
| Ever used an ED (%) | 48.8 | 51.4 | -2.5 |
| Average number of admissions per 1,000 client months | 25 | 26 | -2 |
| Average number of inpatient days per 1,000 client months | 233 | 111 | 121 |
| Average number of ED visits per 1,000 client months | 160 | 124 | 36 |
| <u>Months 1-24 after month of passive enrollment</u> | | | |
| Ever admitted to a hospital (%) | 30.1 | 28.5 | 1.5 |
| Readmitted within 30 days (%) | 9.0 | 3.3 | 5.7 ** |
| Ever used an ED (%) | 64.2 | 67.1 | -2.9 |
| Average number of admissions per 1,000 client months | 30 | 30 | 1 |
| Average number of inpatient days per 1,000 client months | 260 | 137 | 123 * |
| Average number of ED visits per 1,000 client months | 180 | 144 | 36 |
| Sample size (total = 524) | 361 | 163 | |

SOURCE: MDRC calculations based on Medicaid claims data from the Colorado Department of Health Care Policy and Financing.

NOTE: A two-tailed t-test was applied to differences between the outcomes for the program and control groups. Statistical significance levels are indicated as follows: *** = 1 percent, ** = 5 percent, * = 10 percent.

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Table 9

**Estimated Impacts of CRICC Pilot on Filling Prescription Medications,
High-Needs Subgroup**

| Outcome | Program Group | Control Group | Difference (Impact) |
|---|---------------|---------------|---------------------|
| <u>Months 1-12 after month of passive enrollment</u> | | | |
| Filled any prescription medication (%) | 88.2 | 80.7 | 7.5 ** |
| Average number of prescription medications filled per 1,000 client months | 4,677 | 4,748 | -71 |
| <u>Months 13-24 after month of passive enrollment</u> | | | |
| Filled any prescription medication (%) | 79.2 | 70.0 | 9.2 ** |
| Average number of prescription medications filled per 1,000 client months | 4,218 | 4,043 | 174 |
| <u>Months 1-24 after month of passive enrollment</u> | | | |
| Filled any prescription medication (%) | 89.9 | 81.8 | 8.1 *** |
| Average number of prescription medications filled per 1,000 client months | 4,447 | 4,396 | 51 |
| Sample size (total = 524) | 361 | 163 | |

SOURCE: MDRC calculations based on Medicaid claims data from the Colorado Department of Health Care Policy and Financing.

NOTE: A two-tailed t-test was applied to differences between the outcomes for the program and control groups. Statistical significance levels are indicated as follows: *** = 1 percent, ** = 5 percent, * = 10 percent.

effects were about 8 to 10 percentage points for the high-needs subgroup, compared with about 3 to 5 percentage points for the full sample.

Similar to the full sample, there are few statistically significant impacts on hospital admissions or ED use for the high-needs subgroup (Table 8). For example, about 20 percent of both high-needs research groups had a hospital admission in the first year, and about half used the emergency department.

Finally, Table 9 indicates that the program increased the proportion of the high-needs subgroup who filled a prescription for medications. In the first year, for example, 88 percent of the high-needs program group filled a prescription, compared with 81 percent of the high-needs control group. Overall, then, the results suggest that the Kaiser Permanente program helped the high-needs group obtain care other than primary care, but did not reduce hospital admissions significantly for this group in the first two years.

Effects for Kaiser Permanente CRICC Enrollees: The High-Participation Subgroup

Given that a substantial portion of the program group never enrolled in the Kaiser Permanente CRICC program because they opted out of managed care or chose a different managed care provider, estimates using the full sample understate the effects of being enrolled in Kaiser Permanente Colorado (although they provide valid estimates of the effects of passive enrollment). A natural question, therefore, is whether the effects were larger for those who were enrolled. This section investigates that question.

To understand the effects for those who enrolled in Kaiser Permanente managed care, information that was available before random assignment was conducted was used to find a subgroup of the program group with high enrollment rates in Kaiser Permanente Colorado. Because this group is defined by pre-random assignment characteristics, a similar group could be located among the control group members using those same characteristics. If the program is effective, estimated differences for program group members and control group members in this high-participation subgroup should be larger than for the full sample.⁵⁸

Table 10 shows results of this analysis for the two years following passive enrollment. Results are presented for both the high- and low-participation subgroups.

The logic behind this analysis is that the high-participation subgroup was more likely to have received program services and, consequently, any evidence that the program was effective would be seen for this subgroup. However, Table 10 shows only a handful of statistically significant impact estimates for the high-participation subgroup. In the year after the month of passive enrollment, for example, 64.1 percent of the high-participation program subgroup made at least one primary care visit compared with 58.4 percent of the high-participation control subgroup, a statistically significant increase of 5.7 percentage points. Likewise, in the second year after passive enrollment, 36.4 percent of the high-participation program subgroup visited the ED at least once compared with 41.6 percent of the high-participation control subgroup, an

⁵⁸To define the subgroups, a logistic regression was run using program group members to determine which baseline characteristics were associated with enrollment in the Kaiser Permanente CRICC program. The dependent variable was whether the person had been enrolled in Kaiser Permanente Colorado managed care for at least one month following random assignment. Explanatory variables included the list of chronic conditions and demographic characteristics that are shown in Table 2, as well as indicators of the county where the person lived upon entering the study. Results of the logistic regression were used to calculate a predicted probability of enrollment for each person in the study. Program group and control group members with predicted probabilities above the median were placed in the subgroup that had a high probability of enrollment, while other individuals were placed in the subgroup that had a low probability of enrollment. Because the predicted probability was calculated using baseline information, it preserves the benefits of the intent-to-treat analysis. The results are consequently unbiased estimates of the program's effects for the two subgroups.

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Table 10

Estimated Impacts of CRICC Pilot on Use of Health Care Services, by Predicted Probability of Participation in Kaiser Permanente Managed Care

| Outcome | High-Participation Group | | | Low-Participation Group | | |
|---|--------------------------|---------------|---------------------|-------------------------|---------------|---------------------|
| | Program Group | Control Group | Difference (Impact) | Program Group | Control Group | Difference (Impact) |
| Months 1-12 after month of passive enrollment | | | | | | |
| Any type of visit with a primary care provider (PCP) (%) | 64.1 | 58.4 | 5.7 ** | 67.1 | 66.7 | 0.5 |
| Wellness visit (%) | 49.7 | 48.6 | 1.1 | 56.2 | 55.8 | 0.4 |
| Nonphysician visit (%) | 16.1 | 11.9 | 4.2 ** | 15.6 | 13.2 | 2.5 |
| Specialist visit (%) | 62.7 | 55.5 | 7.2 *** | 66.2 | 59.6 | 6.6 ** |
| Ever admitted to a hospital (%) | 14.7 | 16.1 | -1.4 | 15.0 | 15.1 | -0.1 |
| Ever used an emergency department (ED) (%) | 41.9 | 42.0 | -0.1 | 38.6 | 34.7 | 3.8 |
| Average number of PCP visits per 1,000 client months | 386 | 358 | 28 | 410 | 408 | 2 |
| Wellness visits | 185 | 185 | 0 | 236 | 233 | 4 |
| Average number of nonphysician visits per 1,000 client months | 62 | 41 | 21 | 76 | 74 | 1 |
| Average number of specialist visits per 1,000 client months | 697 | 669 | 28 | 636 | 523 | 113 * |
| Average number of hospital admissions per 1,000 client months | 24 | 25 | -1 | 22 | 22 | -1 |
| Average number of ED visits per 1,000 client months | 142 | 119 | 22 | 102 | 110 | -8 |
| Months 13-24 after month of passive enrollment | | | | | | |
| Any type of visit with a PCP (%) | 55.2 | 57.0 | -1.7 | 59.1 | 58.7 | 0.3 |
| Wellness visit (%) | 45.3 | 48.5 | -3.1 | 49.1 | 52.1 | -3.0 |
| Nonphysician visit (%) | 14.6 | 12.4 | 2.2 | 14.3 | 12.7 | 1.6 |
| Specialist visit (%) | 58.4 | 54.1 | 4.3 | 57.2 | 52.0 | 5.2 * |
| Ever admitted to a hospital (%) | 12.4 | 12.0 | 0.4 | 11.8 | 14.9 | -3.1 |
| Ever used an ED (%) | 36.4 | 41.6 | -5.3 ** | 35.5 | 37.5 | -2.0 |
| Average number of PCP visits per 1,000 client months | 280 | 309 | -29 | 311 | 363 | -52 |
| Wellness visits | 152 | 156 | -4 | 189 | 212 | -23 |
| Average number of nonphysician visits per 1,000 client months | 44 | 55 | -11 | 55 | 50 | 5 |
| Average number of specialist visits per 1,000 client months | 545 | 576 | -30 | 484 | 443 | 41 |
| Average number of hospital admissions per 1,000 client months | 20 | 20 | 0 | 16 | 19 | -3 |
| Average number of ED visits per 1,000 client months | 126 | 114 | 12 | 88 | 85 | 3 |

(continued)

Table 10 (continued)

| Outcome | High-Participation Group | | | Low-Participation Group | | |
|---|--------------------------|---------------|---------------------|-------------------------|---------------|---------------------|
| | Program Group | Control Group | Difference (Impact) | Program Group | Control Group | Difference (Impact) |
| <u>Months 1-24 after month of passive enrollment</u> | | | | | | |
| Any type of visit with a PCP (%) | 72.3 | 67.9 | 4.4 * | 75.1 | 74.0 | 1.2 |
| Wellness visit (%) | 60.8 | 59.1 | 1.7 | 64.5 | 63.4 | 1.0 |
| Nonphysician visit (%) | 23.9 | 19.6 | 4.3 * | 22.9 | 20.2 | 2.6 |
| Specialist visit (%) | 71.8 | 67.7 | 4.1 | 72.5 | 68.5 | 4.0 |
| Ever admitted to a hospital (%) | 21.4 | 23.2 | -1.8 | 22.1 | 23.4 | -1.3 |
| Ever used an ED (%) | 52.6 | 56.2 | -3.6 | 50.3 | 50.7 | -0.3 |
| Average number of PCP visits per 1,000 client months | 333 | 334 | -1 | 361 | 386 | -25 |
| Wellness visits | 168 | 170 | -2 | 213 | 222 | -10 |
| Average number of nonphysician visits per 1,000 client months | 53 | 48 | 5 | 65 | 62 | 3 |
| Average number of specialist visits per 1,000 client months | 621 | 623 | -1 | 560 | 483 | 77 |
| Average number of hospital admissions per 1,000 client months | 22 | 23 | -1 | 19 | 21 | -2 |
| Average number of ED visits per 1,000 client months | 134 | 117 | 17 | 95 | 97 | -2 |
| Sample size (N = 2,618) | 907 | 402 | | 924 | 385 | |

SOURCE: MDRC calculations based on Medicaid claims data from the Colorado Department of Health Care Policy and Financing and on Kaiser Permanente encounter data.

NOTE: Two-tailed t-tests were applied to differences between the outcomes for the program and control groups. Statistical significance levels are indicated as follows: *** = 1 percent, ** = 5 percent, * = 10 percent.

estimated decrease of 5.3 percentage points. Because only a few of the outcomes differ significantly between program and control group members, the results do not provide more promising evidence of the effect of the Kaiser Permanente CRICC program compared with what was found for the full sample.

Although these results are intriguing, they fall just short of providing definitive evidence on the effects of the program for those who enrolled in the Kaiser Permanente managed care program. That is because the two groups were defined on baseline characteristics that were predictive of enrollment in Kaiser Permanente managed care rather than enrollment itself. As a result, only 67.3 percent of the high-participation program subgroup was ever in the managed care program while 47.4 percent of the low-participation program subgroup was in managed care at some point. Thus, these results get about halfway from the intent-to-treat estimates to estimates among enrollees. In addition, impact estimates for the subgroup were much less precise than for the full sample, making it more difficult to find statistically significant effects.

Discussion

This document presents final estimates of the effects on health care use of a two-year pilot coordinated care program operated by Kaiser Permanente Colorado for Medicaid recipients with disabilities in two Denver-area counties. Although there have been a number of studies of care management and coordinated care for Medicaid recipients, most have focused on individuals with specific chronic conditions or used evaluation methods that may provide biased estimates. Along with a similar study by MDRC of a coordinated care program run by Colorado Access,⁵⁹ this is one of the few studies to use random assignment to study coordinated care for a broad cross-section of Medicaid recipients with disabilities.

In general, the results provide some evidence that the program affected health care use. For the full sample, the program appeared to increase visits to specialists and to nonphysician providers such as optometrists and physical therapists. The effects on specialty and nonphysician care were especially large for a high-needs subgroup, who also filled more prescriptions for medications than their control group counterparts. The increase in specialty care may reflect the fact that the program allowed individuals to use Kaiser Permanente specialists, which may have increased their access to this type of care. The effects on use of nonphysician providers was also seen in the Colorado Access pilot, which may suggest that coordinated care programs help individuals gain greater access to these providers.

Despite these positive findings, the program did not appear to have some of the intended impacts. In particular, it did not significantly increase use of primary care and it did not generally reduce use of more expensive forms of care such as hospital admissions or emergency department use. Again, this is consistent with results from the Colorado Access pilot. In both cases, most sample members used primary care even without the program, so there was little room for coordinated care to make a difference. This may be a special feature of working with individuals with disabilities, many of whom have established a relationship with a primary care provider in the course of documenting and treating their disabling condition.

One major limitation of the study is that 43 percent of individuals who were assigned to the program group opted to remain in fee-for-service Medicaid or chose a different managed care plan. By doing so, they could not benefit from CRICC coordinated care services, thus reducing its potential effects. Although estimated effects were larger for a high-participation subgroup that was most likely to remain in the Kaiser Permanente CRICC program, those results are much less precisely estimated, making conclusions from that group more tenuous.

A second major limitation is that the study did not have detailed information on the intensity of enhanced coordinated care services that were received by those who remained in the

⁵⁹Michalopoulos, Manno, Kim, and Warren (2013).

Kaiser Permanente system. It is therefore impossible to determine whether some of the small effects are a result of lack of engagement in services or lack of an effectiveness of services that were often used. Discussions with program staff suggest, however, that the coordinated care program might have been less intensive for many CRICC members than more recent studies suggest is needed.⁶⁰

Yet another major limitation is that the study provided information only on outcomes that were available from Medicaid claims. Even though the enhanced coordinated care program was intended to increase the use of social services, this study does not have information on whether or to what degree that happened. Likewise, other studies have found that similar interventions improve the quality of care or patient satisfaction with care, neither of which was included in this analysis.⁶¹ Thus, the generally negative findings on Medicaid use may not tell the full story of the intervention.

Nevertheless, when combined with similar findings from the pilot operated by Colorado Access, these results suggest that the effect of the CRICC program on health care use was likely to be small. More intensive outreach, use of more frequent and in-person meetings between care managers and patients, strengthening systems of notification of emergency department visits and hospital admissions between providers, and focusing more on patients who are likely to be rehospitalized may have produced greater effects and reduced health care costs.

⁶⁰See Brown (2009), although Bodenheimer and Berry-Millett (2008) indicate that it is unclear whether more intensive coordinated care models are more effective.

⁶¹See, for example, Boulton et al. (2009) and Riegel et al. (2002).

Appendix

Outcome Measures Used in This Report

The main outcome measures used in this report are emergency department (ED) visits, hospital inpatient care, outpatient care, and prescription drug use.

Emergency department visits. Claims from institutional and professional files were used to categorize ED visits. More specifically, ED visits were selected from institutional claims with a revenue code of 450 (emergency room) or 459 (other emergency room) and professional claims with Current Procedural Terminology (CPT) medical procedure codes between 99281 and 99288 (ED visits).

Hospital admissions and readmissions. Claims from institutional files with room and board charges (revenue codes between 100 and 219) were first selected. Additionally, only those room and board claims with a bill type code (which contains the bill field from the UB_92 claim form) between 111 and 115 or 117 (hospital inpatient) were considered to be an inpatient stay.

Individuals with a hospital inpatient visit start date within 30 days of a previous inpatient visit's end date were categorized as readmitted to the hospital within 30 days.

Outpatient care. Claims from professional data were used to classify outpatient care. Professional claims that were categorized as ED visits (that is, with a CPT medical procedure codes between 99281 and 99288) were excluded from outpatient care. To classify the type of outpatient care, information from the National Provider Identifier (NPI) registry from the Centers for Medicare and Medicaid Services, which provides a standard unique health identifier for health care providers, was merged onto the professional claims. If the NPI classification was not available, then provider type code and provider specialty code from the professional data were used.

Primary care provider (PCP) visits. If provider type from the NPI data was available, then PCP visits were classified using the following taxonomy codes: family medicine (207Q00000X [general], 207QA0000X [adolescent], 207QA0505X [adult], 207QG0300X [geriatric]); internal medicine (207R00000X [general], 207RA0000X [adolescent], 207RG0300X [geriatric]); obstetrics and gynecology (207V00000X [general], 207VG0400X [gynecology], 207VX0000X [obstetrics]); public health and general preventive medicine (2083P0901X); general group practice (208D00000X); and community health center /clinic (261Q00000X, 261QC1500X, 261QC1800X, 261QF0400X, 261QH0100X, 261QM1000X, 261QP0904X, 261QP0905X, 261QP2300X).

If provider type from the NPI data was not available, then provider type code and provider specialty code were used to categorize PCP visits. Visits with a provider type code of federally qualified health center (32) or rural health clinic (45) were considered PCP visits. Additionally, claims were classified as PCP visits if they had provider type codes of physician (05) or osteopath (26) and provider specialty codes of general practice (01), internal medicine (15), obstetrics and gynecology (53), or family practice (77).

Primary care provider wellness visits. Records that were classified as primary care, but that had a CPT procedure code for wellness care (99201-99205, 99211-99215), were classified as PCP wellness visits.

Nonphysician visits. If provider type from the NPI data was available, then nonphysician visits were classified using the following taxonomy codes: chiropractor (111N00000X- 111NX0800X); dietician/nutritionist (132700000X-136A00000X); optometrist/orthoptist (152W00000X-156FX1900X); podiatrist/podiatric assistant (211D00000X-213ES0131X); respiratory, developmental, occupational, and rehabilitation therapies (221700000X-229N00000X); speech/hearing (231H00000X-237700000X); and other clinic or health center (speech/hearing [261QH0700X], podiatric [261QP1100X], physical therapy [261QP2000X], and rehabilitation [261QR0400X-261QR0404X]).

If provider type from the NPI data was not available, then provider type code was used to categorize nonphysician visits. Provider type codes of podiatrist (06), optometrist (07), optician (08), physical therapist (17), audiologist (19), nonphysician practitioner (24, 25), speech therapist (27), and occupational therapist (28) were used.

Specialist visits. If provider type from the NPI data was available, then specialist visits were classified using the following taxonomy codes: phlebology (202K00000X); neuromusculo-skeletal and sports medicine (204C00000X, 204D00000X); oral and maxillofacial surgery (204E00000X); transplant surgery (204F00000X); allergy and immunology (207K00000X-207KI0005X); anesthesiology (207L00000X-207LP3000X); dermatology (207N00000X-207NS0135X); emergency medicine (207P00000X-207PT0002X); internal medicine with a specialty in allergy and immunology (207RA0201X, 207RI0001X), bariatric medicine (207RB0002X), cardiovascular disease (207RC0000X), clinical cardiac electrophysiology (207RC0001X), critical care medicine (207RC0200X), endocrinology, diabetes, and metabolism (207RE0101X), gastroenterology (207RG0100X), hematology (207RH0000X, 207RH0003X), hospice and palliative medicine (207RH0002X), hepatology (207RI0008X, 207RT0003X), interventional cardiology (207RI0011X), infectious disease (207RI0200X), MRI (207RM1200X), nephrology (207RN0300X), pulmonary disease (207RP1001X), rheumatology (207RR0500X), sports medicine (207RS0010X), sleep medicine (207RS0012X), or oncology (207RX0202X); medical genetics (207SC0300X-207SM0001X); neurological surgery (207T00000X); nuclear medicine (207U00000X-207UN0903X); ophthalmology (207W00000X); orthopedic surgery (207X00000X-207XX0801X); otolaryngology (207Y00000X-207YX0905X); pathology (207ZB0001X-207ZP0213X); physical medicine and rehabilitation (208100000X-2081S0010X); plastic surgery (208200000X-2082S0105X); radiology (2085B0100X-2085U0001X); surgery (208600000X-2086X0206X); urology (208800000X, 2088P0231X); colon and rectal surgery (208C00000X); thoracic surgery (208G00000X); clinical pharmacology (208U00000X); pain medicine (208VP0000X, 208VP0014X); legal medicine (209800000X); clinic/health center with various specialties, including outpatient surgery (261QA1903X, 261QM1300X, 261QM2500X, 261QS0112X, 261QS0132X, 261QX0200X, 261QX0203X); family medicine with a specialty in bariatric medicine (207QB0002X), hospice/palliative care (207QH0002X), sports medicine

(207QS0010X), or sleep medicine (207QS1201X); obstetrics and gynecology with a specialty in bariatric medicine (207VB0002X), critical care (207VC0200X), reproductive endocrinology (207VE0102X), hospice and palliative medicine (207VH0002X), maternal and fetal medicine (207VM0101X), or gynecologic oncology (207VX0201X); and preventive medicine with a specialty in aerospace medicine (2083A0100X), undersea and hyperbaric medicine (2083P0011X), occupational-environmental medicine (2083P0500X), sports medicine (2083S0010X), medical toxicology (2083T0002X), or occupational medicine (2083X0100X).

If provider type from the NPI data was not available, then provider type code and provider specialty code were used to categorize nonphysician visits. Visits with a provider type code of physician (05) or osteopath (26) and one of the following provider specialty codes were considered specialists: emergency medicine (05), cardiovascular disease (12), dermatology (13), gastroenterology (14), physical medicine and rehabilitation (17), pulmonary medicine (19), child psychiatry (21), neurology (22), pathology (31), radiology (32), anesthesiology (41), endocrinology (42), general surgery (51), neurological surgery (52), ophthalmology (54), orthopedic surgery (55), otolaryngology (56), plastic surgery (57), thoracic surgery (58), urology (59), oncology (60), infectious disease (72), peripheral, vascular disease/surgery (74), cardiovascular surgery (91), pediatric cardiology (A3), hand surgery (A4), orthopedics (A9), and physiatrist (C5).

Prescription medications. Claims from prescription drug files were used to classify the use of prescription medications.

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About MDRC

MDRC is a nonprofit, nonpartisan social and education policy research organization dedicated to learning what works to improve the well-being of low-income people. Through its research and the active communication of its findings, MDRC seeks to enhance the effectiveness of social and education policies and programs.

Founded in 1974 and located in New York City and Oakland, California, MDRC is best known for mounting rigorous, large-scale, real-world tests of new and existing policies and programs. Its projects are a mix of demonstrations (field tests of promising new program approaches) and evaluations of ongoing government and community initiatives. MDRC's staff bring an unusual combination of research and organizational experience to their work, providing expertise on the latest in qualitative and quantitative methods and on program design, development, implementation, and management. MDRC seeks to learn not just whether a program is effective but also how and why the program's effects occur. In addition, it tries to place each project's findings in the broader context of related research — in order to build knowledge about what works across the social and education policy fields. MDRC's findings, lessons, and best practices are proactively shared with a broad audience in the policy and practitioner community as well as with the general public and the media.

Over the years, MDRC has brought its unique approach to an ever-growing range of policy areas and target populations. Once known primarily for evaluations of state welfare-to-work programs, today MDRC is also studying public school reforms, employment programs for ex-offenders and people with disabilities, and programs to help low-income students succeed in college. MDRC's projects are organized into five areas:

- Promoting Family Well-Being and Children's Development
- Improving Public Education
- Raising Academic Achievement and Persistence in College
- Supporting Low-Wage Workers and Communities
- Overcoming Barriers to Employment

Working in almost every state, all of the nation's largest cities, and Canada and the United Kingdom, MDRC conducts its projects in partnership with national, state, and local governments, public school systems, community organizations, and numerous private philanthropies.