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REPORT

FINAL REPORT

The Impact of Transitioning Stairstep Children from Separate CHIP to Medicaid on Use of Health Services: Evidence from Colorado and New York

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This report was prepared under contract to the Medicaid and CHIP Payment and Access Commission (MACPAC). The findings, statements, and views expressed in this report are those of the authors and do not necessarily reflect those of MACPAC.

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EXECUTIVE SUMMARY

Mathematica Policy Research studied the impact of the transition of "stairstep" children from separate CHIP to Medicaid as a result of changes in Medicaid eligibility levels for children under the Patient Protection and Affordable Care Act (ACA). In this report, we use administrative enrollment, claims, and encounter data from two early-adopting states to estimate the transition's effect on access to and use of health services.

Background

Before the adoption of the Patient Protection and Affordable Care Act (ACA), state Medicaid programs were required to cover all children under age 6 in families with incomes up to 138 percent of the federal poverty level (FPL). For children ages 6 to 18, the requirement was for those with family incomes up to 100 percent of FPL. Children ages 6 to 18 with family incomes between 100 and 138 percent of FPL—so-called "stairstep children"—could be covered in separate state Children's Health Insurance Programs (CHIP) or Medicaid, at the state's option. By 2010, 30 states had extended Medicaid eligibility to those in this age group up to 138 percent of FPL, and 21 states opted to cover these children through separate CHIP. In these 21 states, families just above the FPL could have children of different ages enrolled in two separate public coverage programs with potentially different benefits, provider networks, cost-sharing provisions, and renewal procedures. Families in these states also needed to transition children from one program to another after each child's sixth birthday.

To simplify coverage for children, the ACA required states to provide Medicaid coverage to all children under age 19 in families with incomes below 138 percent of FPL, with states continuing to receive the higher CHIP matching rate for children previously covered in separate CHIP (Centers for Medicare and Medicaid Services 2013). Due to this change, 21 states were required to transition some children enrolled in separate CHIP to Medicaid by January 1, 2014. In the affected states, an estimated 28 percent of children enrolled in separate CHIP (more than half a million) were expected to transition to state Medicaid programs (Prater and Alker 2013).

Study design

To assess the impact of the stairstep transition on children's access to and use of health services, we used administrative enrollment, claims, and encounter data obtained directly from Colorado and New York, which opted to implement the transition before the 2014 deadline. We compared health care utilization before and after the implementation of the stairstep transition among children eligible for it. We benchmarked these before-and-after trends against those of a comparison population of children who remained consistently eligible for Medicaid throughout the entire study period. By using longitudinal data and capitalizing upon the state-mandated change in the source of coverage for stairstep children, this study could control for child- and family-specific differences, offering rigorous evidence of the effect of enrollment in Medicaid versus separate CHIP.

For the purposes of this analysis, we identified the stairstep group as the cohort of children likely to be transitioned to Medicaid due to their pre-transition age and family income. However, because eligibility for Medicaid is based on family income which can fluctuate over time, the sample included children who do not actually transition to Medicaid, or do so for a short period

of time. We also provide estimates of the effect of the transition on the subgroup of children eligible for the transition who enrolled in Medicaid coverage. This subgroup analysis allows us to isolate the effects of the transition among only those children who actually transitioned into the Medicaid program as a result of the policy change.

Study findings

Findings from the analysis of impacts of the stairstep transition on children's use of health care are mixed. Use of dental services (both any visit and the number of visits) markedly increased for stairstep children in Colorado and New York after the transition. On the other hand, the transition in New York may have negatively affected access to outpatient care. We find small, but statistically significant reductions in use of outpatient services (ambulatory care and well-child visits) associated with the post-transition period in New York. Lastly, our analysis found no impact on children's use of hospital-based care, either in the emergency department (ED) or as an overnight inpatient, in New York. (Underreporting of service encounters by the managed care entities that participate in Colorado's CHIP program prevented us from examining the impact of the transition on medical use measures in Colorado).

Estimates of the change in use of dental care and outpatient services by children who actually transitioned to Medicaid were slightly greater than those for the overall sample, which included all children eligible to transition even if they did not ultimately do so. The observed impacts on service use also persisted over time. Taken together, these alternative sample findings help validate the main results and suggest that the estimated impacts of the transition were more likely due to structural differences between the two programs than to short-term adjustments of moving to a new program.

Discussion

The findings from this study make two important contributions to our understanding about children's access to care under separate CHIP and Medicaid programs. First, to our knowledge, this is the first study to document the outcomes of a policy change that affected more than half a million children and their families. Although the move from separate CHIP to Medicaid could be expected to benefit families in a number of ways, results from this study suggest that these transitions may have also led to small reductions in access to care for some types of services. This suggests the need for more work on examining the outcomes of the transition in other states. Second, results from this study can help inform any future transitions of children across sources of coverage. States may look to the stairstep transition as a test case for how to approach future coverage transitions for children enrolled in CHIP or for broader coverage transitions, as well as the potential impact of those transitions on children's service use.

I. INTRODUCTION

Before the adoption of the Patient Protection and Affordable Care Act (ACA), state Medicaid programs were required to cover all children under age 6 in families with incomes up to 138 percent of the federal poverty level (FPL). For children ages 6 to 18, the requirement was for those with family incomes up to 100 percent of FPL. Children ages 6 to 18 with family incomes between 100 and 138 percent of FPL—so-called "stairstep children"—could be covered in separate state Children's Health Insurance Programs (CHIP) or Medicaid, at the state's option. By 2010, 30 states had extended Medicaid eligibility to stairstep children, and 21 states opted to cover these children through separate CHIP. In these 21 states, families just above the FPL could have children of different ages enrolled in two separate public coverage programs with potentially different benefits, provider networks, cost-sharing provisions, and renewal procedures. Families in these states also needed to transition children from one program to another after each child's sixth birthday.

To simplify coverage for children, the ACA required states to provide Medicaid coverage to all children under age 19 in families with incomes below 138 percent of FPL, with states continuing to receive the higher CHIP matching rate for children previously covered in separate CHIP (Centers for Medicare and Medicaid 2013). Due to this change, 21 states were required to transition some children enrolled in separate CHIP to Medicaid by January 1, 2014. In the affected states, an estimated 28 percent of children enrolled in separate CHIP (more than half a million) were expected to transition to state Medicaid programs (Prater and Alker 2013).

There are conflicting hypotheses about how the move from separate CHIP to Medicaid would affect children's access to and use of care. The transition could be expected to benefit families for the following reasons:

- **One program per family.** Eliminating the age-based stairstep may improve access to and continuity of care because all children in a family, regardless of age, would be enrolled in a single program, with the same providers, cost sharing, and health plans (Prater and Alker 2013).
- **Eliminating cost sharing.** Medicaid features nominal or no cost-sharing requirements compared to separate CHIP (which can require families to pay premiums and cost sharing up to 5 percent of family income combined). Cost-sharing requirements have been found to be a barrier to care for low-income populations (Snyder and Rudowitz 2013).
- **Broader benefits package.** Medicaid offers children a more generous benefits package than most separate CHIP. For example, Medicaid covers any Medicaid-coverable service determined to be medically necessarily regardless of whether it is covered in the state plan under its Early Periodic Screening, Diagnosis, and Treatment provisions, whereas separate CHIP includes more limits and exclusions that resemble those of private insurance (Hill et al. 2013).

However, other differences also exist between the two programs whereby the benefits of the transition for children and families are less clear. For example, Medicaid's lower provider payment rates and fewer participating providers may result in less access to care once children move from separate CHIP to Medicaid (Cunningham and O'Malley 2009). In addition, the

transition itself raised some concerns among stakeholders and child health advocates, most notably about coverage continuity during the transition and potential confusion for families and providers (Orfield et al. 2015).

Limited empirical research exists on the differences between children's access to and use of care in Medicaid versus CHIP. Current evidence suggests that the two programs have similar levels of access and use of medical services. For example, a recent Government Accountability Office (GAO) report revealed that access to care and use of services for CHIP children were generally comparable to those in Medicaid based on responses to the Medical Expenditure Panel Survey from 2007 through 2010 (GAO 2013). CHIP and Medicaid enrollees reported similar use of medical services, including an office-based provider, outpatient department provider, and emergency room visits. The 2014 congressionally mandated evaluation of CHIP also concluded that CHIP and Medicaid enrollees[1] have similar access to and use of care experiences (Harrington et al. 2014). CHIP and Medicaid enrollees were comparable in having a regular source of care or provider and generally encountering little trouble in finding a provider or obtaining appointments when needed. The evaluation found similar levels of medical service use between CHIP and Medicaid enrollees, such as whether children had received a preventive medical visit in the past year. The one exception was that the rate of hospitalization was twice as high for Medicaid enrollees (8 percent versus 4 percent).

Whereas the literature generally supports the idea that Medicaid and CHIP offer children similar access and use experiences for medical services, mixed evidence exists for dental services. Although the GAO report found that CHIP and Medicaid enrollees reported similar levels of use for dental services, including dental care and general dentist and orthodontist visits, Harrington et al. found that CHIP enrollees were more likely to report a dental visit for check-up or cleaning than those in Medicaid (82 percent versus 77 percent).

A. Purpose of this report

To better understand states' experiences in implementing coverage transitions for children, including efforts to make transitions as seamless as possible and ensure continuity of care, the Medicaid and CHIP Payment and Access Commission (MACPAC) contracted with Mathematica Policy Research to study the stairstep transition. In a fall 2015 report, we documented states' approaches to the transition and identified common challenges and lessons learned that could support future transitions between health coverage programs based on interviews with state administrators and other stakeholders in 10 of the 21 states that transitioned stairstep children (Orfield et al. 2015).

In this follow-up report, we use administrative enrollment, claims, and encounter data from two early-adopting states to estimate the transition's effect on access to and use of services. Specifically, through descriptive and multivariate components, we assess whether the transition of children from separate CHIP to Medicaid in Colorado and New York affected children's access to and use of care. This study addresses three primary questions:

[1] To create CHIP and Medicaid samples that, aside from differences in income, were equivalent and comparable, the evaluation's survey analyses excluded from the Medicaid group all individuals whose eligibility was not based on income at the time of sample frame construction.

- Did the transition of children from separate CHIP to Medicaid have an effect on access to and use of care? Were impacts short term or sustained over time?
- Did transition effects differ across different health care outcomes and/or across subgroups of children?

Results from this study can help inform considerations of any future coverage transitions for children enrolled in CHIP. We are unaware of any studies that have estimated rigorously the impact of the ACA-required transition of the stairstep children on use of health services. The main limitation of much of the previous empirical work stems from its cross-sectional design. Simply comparing actual, realized service use for children enrolled in Medicaid versus separate CHIP does not take into account potentially important differences between families with children enrolled in those two programs that could affect their access to and use of health services. By using longitudinal data and exploiting the exogenous change in the source of coverage for stairstep children, this study controlled for child- and family-specific differences, thus offering far more rigorous evidence of the effect of the change in enrollment from separate CHIP to Medicaid than existing cross-sectional studies provide.

Findings from the analysis of impacts of the stairstep transition on children's use of health care are mixed. We consistently find large increases in dental use in both Colorado and New York after the transitions; however, we also find small, but statistically significant reductions in use of outpatient services (ambulatory care and well-child visits) associated with the transition in New York.[2] There is little to suggest that the transition affected children's hospital-based care, either in the ED or as an overnight inpatient. The observed impacts in use of dental and outpatient services persisted over time, suggesting that the associated changes were more likely due to structural differences between the two programs, such as provider availability and differences in cost sharing, than to short-term adjustments to a change in health plans or providers.

The remainder of the report proceeds as follows. In Section II, we provide the transition background on Colorado and New York, including a description of their Medicaid and separate CHIP programs, and key strategies and activities related to their transition of children from separate CHIP to Medicaid. We describe our data and methodological approach in Section III. Section IV presents our results and specification checks. Section V presents the limitations of the analysis and concludes with a discussion of policy implications.

[2] Underreporting of service encounters by the managed care entities that participate in Colorado's CHIP program prevented us from conducting an analysis of the transition on medical service use measures in Colorado. Colorado's data on dental visits in CHIP did not display the same limitations, permitting an analysis of the transition on dental services.

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II. BACKGROUND ON THE TRANSITIONS IN COLORADO AND NEW YORK

At the time the ACA was enacted in March 2010, 21 states covered stairstep children under separate CHIP programs and thus needed to transition them to Medicaid to comply with the law's requirement. New York and Colorado were among the four states that opted to implement the transition before the 2014 deadline.[3] Their implementation experiences are described below; Table II.1 summarizes key features of each state's public insurance landscape and the stairstep transition.

Table II.1. Characteristics of study states at time of stairstep transition

	Colorado (as of January 2013)		New York (as of November 2011)	
State context	**Medicaid**	**CHIP**	**Medicaid**	**CHIP**
Program name	Medical Assistance Program	Child Health Plan Plus (CHP+)	Medicaid	Child Health Plus (CHPlus)
Delivery system	Fee-for-service	Managed care	Managed care	Managed care
Separate CHIP upper income limit	N/A	250 percent FPL	N/A	400 percent FPL
Medicaid upper income limit (ages 6-19)	138 percent FPL	N/A	138 percent FPL	N/A
12-month continuous eligibility	No	Yes	Yes	Yes
Premiums at 101 percent of FPL	N/A	No	N/A	No
Co-payments at 101 percent of FPL	N/A	Yes	N/A	No
Separate CHIP and Medicaid administered by same agency	Y		Y	
Same eligibility system for Medicaid and separate CHIP	Y		N	
Details about the transition				
Estimated size of stairstep population	19,000		>100,000[a]	
Estimated size of stairstep population as a percentage of children ever enrolled in CHIP during fiscal year of transition	23%		>18%	
Timing of transition	January 1, 2013		November 1, 2011	
Type of transition	Phased in upon renewal		Phased in upon renewal	

Sources: Prater and Alker, 2013; Orfield et al. 2015; Heberlein et al. 2013; Silow-Carroll and Rodin 2013; Hill and Benatar 2012; Kaiser Family Foundation State Health Facts 2016.

Notes: N/A = not applicable.

[a] New York's Department of Health moved more than 100,000 from separate CHIP to Medicaid as a result of the state's change in eligibility rules for stairstep children (Silow-Carroll and Rodin 2013).

[3] California and New Hampshire also transferred children from separate CHIP to Medicaid ahead of the deadline, but unlike New York and Colorado, they transferred all separate CHIP children to Medicaid, thereby eliminating their entire separate CHIP programs.

Colorado. Colorado administrators reported that the state adopted the stairstep transition ahead of the ACA's 2014 deadline because of anticipated benefits for the state budget (Orfield et al. 2015). The state was poised to realize significant cost savings from the transition for several reasons: (1) separate CHIP operates through managed care in Colorado; the per member per month rates paid through this delivery system were, on average, higher than the amounts paid for each child enrolled in the fee-for-service delivery system used in Medicaid,[4] (2) states would continue to receive CHIP's enhanced Federal Medical Assistance Percentage (FMAP) for stairstep children once they transitioned to Medicaid, and (3) the state incurred administrative costs transferring children between the two programs when they turned six, a step the policy change would eliminate. Primary care medical providers also stood to benefit from the transition because, unlike in separate CHIP, those seeing Medicaid patients would receive the temporary enhanced Medicaid reimbursement rate authorized by the ACA for primary care services.[5] Finally, although cost sharing in Colorado's separate CHIP was minimal, after the transition families would no longer be required to pay co-payments for the children who transitioned to Medicaid (Heberlein et al. 2013). Although stairstep children in Colorado would be moving to a different delivery system, administrators in Colorado reported few concerns about children losing access to providers as a result of the transition because they were moving from a restricted provider network in separate CHIP to a system in which any willing provider can participate (Orfield et al. 2015).

Colorado enacted legislation in April 2011 that would have allowed the stairstep transition to begin later that year. Implementation was delayed from a fall 2011 start date to January 2013 because of IT systems issues (Prater and Alker 2013). All new applicants within the stairstep age and income bracket were enrolled directly in Medicaid, and existing separate CHIP enrollees in that bracket were transitioned to Medicaid at their renewal date or when eligibility was otherwise being redetermined (such as following a reported change in family circumstance or at the request of the family). Colorado transitioned children at renewal because administrators viewed the approach as less burdensome administratively than transitioning them all at one time. Further, due to the fact that 12-month continuous coverage was available for separate CHIP but not for Medicaid it was more beneficial to enrollees to execute the transition at the end of the child's separate CHIP eligibility period. (Colorado implemented 12-month continuous coverage for children in Medicaid in 2014.) Some stakeholders in Colorado expressed disappointment in the delay, but overall the transition was described as very smooth (Orfield et al. 2015).

New York. In New York, administrators began transitioning stairstep children ahead of the federal deadline in an effort to align Medicaid income eligibility for all children ages one to 18 (Hill and Benatar 2012). Before the transition in New York, both separate CHIP and Medicaid had managed care delivery systems. The health plans and provider networks offered through the

[4] For fiscal year 2011–2012, the estimated per capita cost for each child in Colorado's Medicaid program was $1,835; the estimated per capita cost for each child in Colorado's separate CHIP was $2,364 (Colorado Legislative Council Staff 2011).

[5] The ACA implemented a temporary bump in Medicaid payments for primary care providers. Section 1202 of the ACA required states to increase Medicaid primary care provider payments to equal Medicare Part B payment levels between January 1, 2013 and December 31, 2014 (Medicaid.gov 2015). Although the increased reimbursement rate officially expired, Colorado (among other states) has continued to keep this rate at the Medicare level (Advisory Board Company 2015).

two programs were nearly identical, meaning most families did not need to adjust to a different delivery system or find new providers when their stairstep children transitioned from separate CHIP to Medicaid (Hill and Benatar 2012). New York's separate CHIP imposed premiums on some children, but not for stairstep children. Medicaid in New York offered families a more generous benefits package (for example, full coverage of Early and Periodic Screening, Diagnostic, and Treatment [EPSDT], personal care, and home health benefits exists in Medicaid but not separate CHIP); however, benefits in separate CHIP were perceived by stakeholders interviewed as part of the 2014 congressionally mandated evaluation of CHIP to be comparable to Medicaid and at least as generous as private insurance, if not more so (Hill and Benatar 2012).

The New York State Department of Health issued an administrative directive to begin moving stairstep children from separate CHIP to Medicaid at the time of the child's renewal, effective November 1, 2011. In New York, families renew separate CHIP directly with their CHIP health plan. Initially, stairstep children began the renewal process with their health plan as usual; if the child appeared to be Medicaid eligible under the new requirements, families would be instructed to apply directly to Medicaid through a local Department of Social Services office, using a different application. Children received an additional 60 days of CHIP eligibility to allow time for application submission and processing, but this process raised concerns about children losing coverage during the transition (Prater and Alker 2013; Silow-Carroll and Rodin 2013). In June 2012, New York began using Express Lane Eligibility (ELE) to streamline the stairstep transition. With ELE, families did not need to fill out a new application or provide new income documentation. CHIP health plans were able to make the initial Medicaid eligibility determination and automatically transition stairstep children to Medicaid (Silow-Carroll and Rodin 2013). Children received 60-day temporary CHIP coverage until the county had fully processed Medicaid enrollment. Administrators reported that this ELE process improvement resulted in administrative savings, saved time for families by eliminating the Medicaid application process, and generated no reports of children losing coverage (Silow-Carroll and Rodin 2013).

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III. METHODS

A. Overview

Our methodological approach compared health care utilization before and after the implementation of the stairstep transition among children eligible for it. We benchmarked these before-and-after trends against those of a comparison population of children who remained consistently eligible for Medicaid throughout the entire study period. To implement this design, we constructed a longitudinal panel comprising treatment and comparison cohorts using state-specific administrative data drawn from enrollment and claims/encounter data systems.

B. Data

We obtained Medicaid and separate CHIP enrollment, claims, and encounter files from the Colorado Department of Health Care Policy and Financing and the New York State Department of Health. First, we constructed an enrollment history file for each state that contained one longitudinal enrollment record for each child ever enrolled in Medicaid or separate CHIP over the study period. The single record detailed, for each month of the period, whether the child was enrolled in the state's Medicaid program, Medicaid expansion CHIP, or a separate CHIP program. This file served as the population from which we selected the treatment and comparison samples for the utilization analysis.

Next, we constructed an analytic file for each study state that contained one record per child per year for the study period. Children in the Colorado file could contribute up to five separate observations for the five-year study period; in New York, each child could contribute up to four separate observations for the four-year study period. For Colorado, the full study period ran from January 1, 2011 to December 31, 2015; for New York, the full study period ran from November 1, 2010 to October 31, 2014.

The analysis files included all children in the treatment and comparison groups, described further below. Each observation contained two sets of characteristics: (1) outcomes, which described a child's service use in that analysis year and (2) covariates, which summarized a child's demographic characteristics and sample status (treatment or comparison group).

C. Empirical specification

Our design compared stairstep children's health care use while in separate CHIP with their use after the stairstep transition. Under this design, each child served as his or her own control, providing a pre-post comparison free from the influences of unchanging observed and unobserved child- and family-specific factors (for example, pre-existing health conditions or fixed parental perceptions about differences across CHIP and Medicaid) that could confound the relationship between type of coverage (Medicaid versus CHIP) and utilization. Although this within-child design accounted for any potential biases arising from stable child-specific influences, it could not account for sources of confounding that change over time. Of specific concern is the potential influence of any broad secular trends driving utilization patterns over time. To account for such trends, we augmented the sample with a set of control children of comparable age with slightly lower incomes, comparing their within-child, pre-post differences with those of stairstep children. This quasi-experimental design is often termed a difference-in-

differences approach, reflecting the underlying comparison inherent in the method: the difference in the outcome of interest before and after the transition for treatment children is compared to the analogous pre-post difference for control children. The underlying assumption is that, absent the transition, the trends in the outcome measures would be the same across treatment and comparison children. Although this assumption does not require that treatment and comparison children exhibit the same underlying *levels* of the outcome variables, it does require that the presence of any known and unknown secular trends exerts similar effects on the *trends* in the outcomes. In practice, better-matched baseline levels of the outcome measures across treatment and comparison groups provide greater reassurance regarding the (untestable) parallel trends assumption.

Our treatment group (described below) includes the cohort of children likely to be transitioned to Medicaid due to their pre-transition age and family income. However, because eligibility for Medicaid is based on family income which can fluctuate over time, the sample will include children who do not actually transition to Medicaid, or do so for a short period of time. Therefore, our estimates are intent-to-treat (ITT) effects. We also provide estimates of the effect of the transition on children who, post-transition, enrolled in Medicaid coverage (treatment on treated effects).

1. Study sample

Treatment group definition. We selected children for the stairstep treatment group if, based on their age, enrollment history, and family income, they were eligible for the transition from the state's separate CHIP program to Medicaid as a result of the policy change. Specifically, the treatment group consisted of children who, during the year before the state's transition period,[6] were at least five years of age, enrolled for a minimum of six months in the separate CHIP program, and whose family income was between 100 and 138 percent of the FPL. We chose six months as the threshold rather than a longer or shorter period, recognizing that low-income families are subject to fluctuations in income that might temporarily put them outside of the income range of the stairstep.

We imposed two additional inclusion criteria for the treatment group used in the impact evaluation, thus limiting the population included in our analysis. First, following the literature, we limited the analysis sample to those children continuously enrolled in Medicaid or CHIP during the analysis period (DeLeire et al. 2013; Kenney et al. 2011; Martin et al. 2014; Sen et al. 2014). Continuous enrollment ensured that we had a complete record of beneficiaries' service use. Second, we restricted the treatment group by excluding those children with public coverage eligibility in non-income related categories, such as pregnancy or disability, because children enrolled for these reasons are likely to have service use patterns that differ greatly from those eligible for coverage due to family income.

Comparison group definition. Our comparison group consisted of children who had age and enrollment history characteristics similar to those of treatment group children but were enrolled in the Medicaid program because their family income was below the pre-transition

[6] The transition period was defined as January 2013 through December 2014 for Colorado and November 2011 through October 2012 for New York.

Medicaid eligibility ceiling. We constructed the comparison group by identifying all children age five or older who were enrolled in Medicaid during the year before the state's transition period for a minimum of six months, and whose family income was below 100 percent of the FPL.[7] To be included in the analytic sample, a comparison group member had to meet the same additional criteria as the treatment group members—that is, the child had to be continuously covered in Medicaid or CHIP for during the analysis period and eligibility during the period was for income-related reasons.

Alternative samples. Although we use an intent-to-treat approach to defining the treatment and comparison groups for our primary analyses, we recognize some stakeholders could be interested in impacts among only those children who actually transitioned into the Medicaid program as a result of the policy change (treatment on treated [ToT] effects). To address this possibility, we conducted a second set of impact analyses, further restricting the treatment group to those continuously enrolled in Medicaid in the year *following* the transition period and whose family income was between 100 to 138 percent of the FPL—in other words, those children who would have been enrolled in separate CHIP in the absence of the policy change.

We also conducted a series of sensitivity analyses to explore the consistency of the impact estimates with respect to how the treatment and comparison groups are defined. These checks included using higher and lower thresholds for the enrollment criteria (such as a three-month enrollment rule), and allowing for children who were not enrolled in Medicaid or CHIP for the entire study period. The criteria used to define treatment and comparison groups for all samples used in this study are presented in Appendix Table A.1.

2. Regression models

We estimated the following individual-level specification using multivariate regression:

$$(1) \qquad Y_{it} = \beta_1 Year1_t + \beta_2 Year2_t + \beta_2 Age_{it} + \delta_t + \zeta_i + \varepsilon_{it}$$

where *i* indexes individuals and *t* indexes year. The relationship of interest is health care utilization Y_{it}—operationalized in separate models using the outcome measures detailed below—as a function of whether the sample member was a member of the treatment group after the transition to Medicaid had been implemented. We allowed for potential heterogeneity in impacts by time since transition, with β_1 representing the impact in the first year after the start of the transition ($Year1_t$) and β_2 representing the impact in the second year after transition ($Year2_t$). Note that the $Year1_t$ and $Year2_t$ dummy variables take a value of 1 for treatment group members and a value of 0 for comparison group members. As a result, the predicted values for the treatment group included these terms, whereas the predicted values for the comparison group relied solely on the terms comprising the age and child fixed effects (described in more detail below). In Colorado, $Year1_t$ and $Year2_t$ correspond to calendar time periods January 1, 2013 to December 31, 2013 and January 1, 2014 to December 31, 2014, respectively; in New York they correspond to November 1, 2011 to October 31, 2012 and November 1, 2012 to October 31,

[7] If a child met the criteria for both the treatment and comparison group (that is, during the year before the transition he/she was enrolled in CHIP due to stairstep eligibility for exactly six months and also enrolled in Medicaid for exactly six months), we assigned the child to the treatment group.

2013, respectively. In a separate analysis, we modified this framework by extending the analysis period to include a third post-transition year.

Control variables include age (Age_{it}), two separate year dummies reflecting each post-period year (δ_t) and child-specific dummies (ζ_i)—the child fixed effects. Note that we exclude time-invariant child-level controls such as race and sex from the model, as the inclusion of child fixed effects obviates the ability to estimate the effects of stable characteristics. The estimates of interest, β_1 and β_2, represent the *within-child* change in the outcome of interest compared to the comparison children after the transition relative to before. ε_{it} represents a mean-zero random error term. We estimated a linear probability model for dichotomous outcomes and a poisson model for count outcomes, in keeping with the related literature (DeLeire et al. 2013). We calculated all standard errors using the heteroskedasticity-robust Huber-White method.

3. Outcome measures

The dependent variables were several health care utilization measures that reflect care receipt over a one-year period. We examined the following five specific service types: (1) ambulatory visits, (2) well-child visits (a subset of ambulatory visits), (3) inpatient admissions, (4) emergency department (ED) visits, and (5) dental visits. We captured utilization in two ways: first, by a dichotomous variable reflecting whether or not a child had at least one visit over the course of the year; and second, a count variable reflecting the number of total visits received over the course of the year. The dichotomous measures reflect whether a child received *any* care, whereas the count measures reflect the *intensity* of care. We constructed the outcomes using claims and encounter files (collectively referred to as "claims" hereafter) from both providers and institutions, relying primarily (although not exclusively) on procedure and diagnoses codes to flag service types.

We constructed the outcome measures to align with Healthcare Effectiveness Data and Information Set (HEDIS) specifications for each of the five service categories. We chose HEDIS specifications because they are the most commonly employed quality measures among providers and plans; moreover, the Child Core Set—a measure set created specifically to monitor quality among children covered in Medicaid or CHIP—draws heavily from HEDIS measures. Two of the service types of interest—well-child visits and ED visits—are included in the Core Set. When necessary, we adapted the specifications to account for any state-specific coding procedures deviating from national norms. While these outcome measures are used to assess children's access to and use of services, our analysis is unable to assess whether the quality of services received by children was different between the two programs.

IV. RESULTS

In this section, we present findings from the analysis of impacts of the stairstep transition on outcomes for children in New York and Colorado. We begin by describing sample sizes, demographic and enrollment characteristics, and mean outcomes, by time period, for the treatment and comparison groups. These mean outcomes provide a descriptive picture of trends over time for treatment and comparison group children. We then discuss the results of the multivariate regression models, which comprise the difference-in-difference impact estimates—the key study results of interest. We also report the results from stratified analyses exploring the presence of differential effects of the transition across subgroups of children. Finally, we discuss results from a series of specification checks designed to assess the robustness of the primary findings.

A. Sample description

Descriptive statistics from our final ITT treatment and comparison samples are presented in Tables IV.1 and IV.2.

Sample size and demographic characteristics. Sample sizes for the stairstep (treatment) and Medicaid (comparison) groups for Colorado and New York are shown in the first row of Table IV.1. The sample for Colorado includes 128,477 children—5,259 stairstep children and 123,218 in the Medicaid comparison group. The sample for New York includes 365,991 children—25,338 stairstep children and 340,653 in the Medicaid comparison group.

Table IV.1. Characteristics of treatment and comparison children, Colorado and New York

	Colorado		New York	
	Treatment	Comparison	Treatment	Comparison
Sample size	5,259	123,218	25,338	340,653
Demographic characteristics at baseline				
Age (years)	10.5	10.0	11.3	10.3
Age 6 to 8 (%)	28.3	36.6	17.4	32.7
Age 9 to 11 (%)	33.1	30.9	34.6	31.2
Age 12 to 16 (%)	38.5	32.5	48.0	36.0
Female (%)	49.4	49.6	47.9	50.6
Race/ethnicity: White (%)	53.3	54.7	38.9	43.3
Race/ethnicity: Black (%)	26.5	23.8	11.1	26.0
Race/ethnicity: Hispanic (%)	4.5	8.7	27.5	11.6
Race/ ethnicity: Other (%)	14.9	12.2	13.4	10.9
Race/ ethnicity: Missing (%)	0.8	0.6	9.1	8.2
Located in urban county (%)	84.5	87.6	92.7	93.5
Located in rural county (%)	15.3	12.4	7.2	5.5
Medicaid and CHIP enrollment				
Months enrolled in year				
Medicaid				
Pre-baseline	3.71	10.38	NA	NA
Baseline (Y0)	1.28	11.73	0.4	11.9
Transition (Y1)	8.25	11.72	3.3	11.9

	Colorado		New York	
	Treatment	Comparison	Treatment	Comparison
Post-transition (Y2)	9.96	11.76	7.2	11.9
CHIP				
Pre-baseline	6.58	0.51	NA	NA
Baseline (Y0)	10.72	0.27	11.6	0.1
Transition (Y1)	3.75	0.28	8.7	0.1
Post-transition (Y2)	2.04	0.24	4.8	0.1
Ever enrolled in year (%)				
Medicaid				
Pre-baseline	48.0	97.4	NA	NA
Baseline (Y0)	36.1	100.0	11.2	99.7
Transition (Y1)	89.5	99.5	47.7	99.8
Post-transition (Y2)	86.5	98.7	66.3	99.6
CHIP				
Pre-baseline	79.2	10.8	NA	NA
Baseline (Y0)	100.0	9.4	100.0	1.7
Transition (Y1)	67.2	7.3	90.0	0.8
Post-transition (Y2)	20.3	3.2	49.3	0.8

Source: Analysis of linked Medicaid and CHIP enrollment, claims, and encounter data provided by Colorado Department of Health Care Policy and Financing and New York State Department of Health.

Notes: Years are measured relative to the start of the transitions in Colorado (January 1, 2013) and New York (November 1, 2011). For example, the pre-baseline year in Colorado is January 1, 2011 to December 31, 2011; the baseline year (Y0) is January 1, 2012 to December 31, 2012; the transition year (Y1) is January 1, 2013 to December 31, 2013; and the post-transition year (Y2) is January 1, 2014 to December 31, 2014.

NA = not available.

With the exception of Hispanic ethnicity, the demographic profiles of the stairstep and comparison group children in Colorado are comparable (see Table IV.1). At the start of the stairstep transition, children in the Colorado stairstep treatment group were 10.5 years of age on average compared to 10.0 for children in the Medicaid comparison group. The gender composition of children across the two groups was similar. Whereas whites and blacks made up similar percentages of treatment and comparison group children, a considerably higher proportion of comparison group children were Hispanic relative to their treatment counterparts (8.7 percent versus 4.5 percent, respectively). In New York, the demographic profiles of stairstep treatment and Medicaid comparison group children differed more markedly relative to Colorado. Whereas they had comparable across-gender composition and urban/rural status, stairstep and Medicaid children in New York differed across age, and especially race. Stairstep children were slightly older than Medicaid comparison group children (11.3 and 10.0 years at the time of transition, respectively). Black children were much more likely to be in the Medicaid comparison group than in the stairstep treatment group (25.0 percent vs. 11.1 percent, respectively); the stairstep treatment group had a higher percentage of Hispanic children relative to the Medicaid comparison group (27.5 percent vs. 12.7 percent, respectively).

Enrollment characteristics. The bottom panel of Table IV.1 presents enrollment characteristics of the treatment and comparison groups. We present both the average number of months enrolled in the relevant time period and the percentage of children in each group who were ever enrolled in the program during the time period. These summary statistics shed light on the pre- and post-transition enrollment profiles of transition children, and how they compare to

the Medicaid comparison sample. Treatment group children (that is, those identified at baseline as eligible for the transition) spent the majority of the baseline pre-transition year enrolled in CHIP and then had increased time enrolled in the Medicaid program over the two post-periods. By the post-transition year, children in the treatment group were enrolled in Medicaid for an average of 10.0 months in Colorado and 7.2 months in New York. Importantly, these estimates provide support that the enrollment history profile of the ITT treatment group is largely consistent with the expected outcomes of the transition – older children enrolled in separate CHIP transitioning to Medicaid as a result of the policy change.

The enrollment patterns suggest that of the children eligible for the transition, a greater proportion transitioned into the Medicaid program in Colorado than New York. Whereas stairstep children in Colorado spent the vast majority of their time in Medicaid during the post-transition period, in New York almost 50 percent of stairstep children had at least a one-month period in CHIP during the first post-transition year (on average spending 4.8 months in CHIP). This difference across states might be due to greater fluctuations in family income that resulted in children remaining eligible for CHIP, or delays in implementing the transition for families in New York. Thus, any impacts measured among the ITT sample in New York might understate the impacts among those who actually transitioned into Medicaid due to the policy change (the transitioned sample). This possibility will be explored in Section IV.B.4.

The enrollment results also indicate that it was common for stairstep children to move between Medicaid and CHIP *before* the stairstep transition—a finding consistent with previous studies that used administrative data to measure movement between programs (Orzol et al. 2015; Czajka 2012). In Colorado, where we had enrollment data going back 24 months before the start of the transition, we found that approximately 50 percent of stairstep children were enrolled for at least one month in the Medicaid program during calendar year 2011 (pre-baseline year; two years before the transition year). This finding supports the view that families affected by the stairstep transition already were likely to be familiar with the Medicaid program because of the younger age-based eligibility or family income fluctuations led to the child's previous enrollment in Medicaid. It is also possible that families were familiar with the Medicaid program if they had other children enrolled in the Medicaid.

Health care use. Table IV.2 presents descriptive findings on health care use for the stairstep treatment and Medicaid comparison groups by type of service—hospital-based care (inpatient admissions and ED visits), outpatient care (ambulatory visits and well-child visits), and dental care (visits to a dental provider). We examine yearly utilization rates (both the percentage with any visit and the count of visits) for the baseline year and separately for each of the two post-period years.

In New York, service use for the stairstep children during the year before the transition (baseline year) was slightly lower than national estimates for publicly insured children. However, stairstep children are older relative to these national averages; thus, we would expect them to have lower utilization rates (Burns and Leininger 2012). Inpatient admissions were extremely rare during the baseline year (approximately 1 percent, compared to a national average of 3 percent [Data Resource Center for Child and Adolescent Health 2015a]); almost one in five had an ED visit (compared to a national average of 28 percent [Kenney and Coyer 2012]). Stairstep children exhibited frequent use of outpatient care during the pre-transition baseline year. More

than 90 percent had at least one ambulatory visit with a primary care provider, compared to a national average of 94 percent (Kenney and Coyer 2012). The mean rate for having had at least one well-child visit (68 percent) during the baseline year was lower than the national average of 82 percent (Kenney and Coyer 2012); again, these differences are likely due to the stairstep group comprising an older population. Stairstep children had rates of any dental visit in the past year slightly lower than but on par with the national average (67 percent, compared to a national average of 74 percent [Data Resource Center for Child and Adolescent Health 2015b]) during the year before the transition.

Table IV.2. Unadjusted mean outcomes for treatment and comparison children, Colorado and New York

	Colorado		New York		Medicaid and CHIP national average
	Treatment	Comparison	Treatment	Comparison	
Any visits in the year (%)					
Any inpatient admissions					
Baseline (Y0)	0.5	0.7	1.2	1.4	3.1
Transition (Y1)	1.0	0.8	1.2	1.4	3.1
Post-transition (Y2)	0.9	0.8	1.1	1.4	3.1
Any ED visits					
Baseline (Y0)	8.8	25.1	17.8	22.4	27.8
Transition (Y1)	16.3	24.3	18.5	22.2	27.8
Post-transition (Y2)	18.8	26.3	18.6	22.0	27.8
Any ambulatory visits					
Baseline (Y0)	32.3	65.9	90.3	86.3	93.9
Transition (Y1)	59.5	65.0	90.1	86.2	93.9
Post-transition (Y2)	62.5	64.8	90.6	86.4	93.9
Any well-child visits					
Baseline (Y0)	16.3	35.7	68.2	62.0	81.7
Transition (Y1)	33.5	35.0	68.3	63.7	81.7
Post-transition (Y2)	36.6	35.7	70.8	65.4	81.7
Any dental visits					
Baseline (Y0)	63.5	72.6	67.1	63.8	73.9
Transition (Y1)	65.8	71.3	65.8	62.8	73.9
Post-transition (Y2)	66.6	69.7	67.9	61.1	73.9
Number of visits in the year (#/year)					
Number of inpatient admissions					
Baseline (Y0)	0.006	0.008	0.014	0.016	NA
Transition (Y1)	0.011	0.009	0.014	0.016	NA
Post-transition (Y2)	0.010	0.010	0.014	0.016	NA
Number of ED visits					
Baseline (Y0)	0.121	0.403	0.253	0.347	NA
Transition (Y1)	0.225	0.392	0.265	0.345	NA
Post-transition (Y2)	0.290	0.435	0.265	0.342	NA

	Colorado		New York		Medicaid and CHIP national average
	Treatment	Comparison	Treatment	Comparison	
Number of ambulatory visits					
Baseline (Y0)	0.855	1.994	3.656	3.381	NA
Transition (Y1)	1.625	1.978	3.633	3.384	NA
Post-transition (Y2)	1.912	1.995	3.756	3.473	NA
Number of well-child visits					
Baseline (Y0)	0.167	0.370	0.787	0.765	NA
Transition (Y1)	0.345	0.363	0.787	0.774	NA
Post-transition (Y2)	0.381	0.370	0.818	0.796	NA
Number of dental visits					
Baseline (Y0)	1.238	1.813	1.402	1.624	NA
Transition (Y1)	1.514	1.811	1.374	1.593	NA
Post-transition (Y2)	1.609	1.700	1.512	1.529	NA

Source: Analysis of linked Medicaid and CHIP enrollment, claims, and encounter data provided by Colorado Department of Health Care Policy and Financing and New York State Department of Health.

Notes: Years are measured relative to the start of the transitions in Colorado (January 1, 2013) and New York (November 1, 2011). For example, the pre-baseline year (Y1) in Colorado is January 1, 2011 to December 31, 2011; the baseline year (Y0) is January 1, 2012 to December 31, 2012; the transition year (Y1) is January 1, 2013 to December 31, 2013; and the post-transition year (Y2) is January 1, 2014 to December 31, 2014.

ED = emergency department; NA = not available.

Service use for the stairstep and comparison groups of children in New York during the pre-transition baseline year was largely comparable. Small differences between the two groups existed in rates of inpatient admissions and ED visits (slightly greater for the comparison group), and rates of well-child, ambulatory visits, and dental visits (slightly greater for the stairstep group).

Children in both groups had relatively stable rates of service use over the three-year analysis period, with the exception of well-child visits (slightly increasing for both treatment and comparison samples) and dental visits (slightly increasing for the treatment group and decreasing for the comparison group), although these changes over time were small.

In contrast to New York, medical service use during the pre-transition baseline period for stairstep children in Colorado (while enrolled in CHIP) was substantially lower than expected, given national averages. For example, the data suggest that only 9 percent of stairstep children had an ED visit during the baseline period, compared to the national average of 28 percent. Mean rates of having any outpatient services during the baseline period were two to four times lower than national averages, and well below other benchmarks that take into account child age (HHS 2014). Importantly, rates of ED, well-child, and general ambulatory visits for the comparison sample of Medicaid-enrolled children were two to three times greater than rates observed for stairstep children.

Although it is possible that we might have observed notable differences in medical service use due to differences in program structure (such as presence of co-payments) and in the health care needs of the two populations, we do not believe the rates observed for transition children

accurately depict service use while enrolled in CHIP. It is more plausible that the low rate of service use observed among the transition children is due to underreporting of service encounters by the managed care entities that participate in Colorado's CHIP program.[8]

Colorado data on dental visits in CHIP do not display the same limitations. These services were delivered separately by the separate CHIP dental insurance plan, thus we do not believe the data suffer from the same reporting problem as the medical data provided by the state for the five main managed care entities participating in Colorado CHIP. Dental visit rates during the baseline period were 64 percent—close to observed rates in New York among stairstep children (67 percent). Unlike in New York, the baseline dental visit rate was higher for the comparison sample (73 percent) than for the stairstep group (64 percent). As in New York, dental visit rates for the stairstep group increased slightly over time, whereas rates declined slightly over time for the comparison group.

The encounter data problems suggested by the descriptive analysis of service use for stairstep children in Colorado prevent us from assessing transition impacts for the four medical service use outcomes. Because of the significant underreporting of medical encounters in managed care data reported for children enrolled in CHIP, any estimated impact estimates of the transition will be confounded by the reporting differences. However, we are able to estimate impacts of the transition on dental use in Colorado because the data on dental service use from both CHIP and Medicaid appear to be complete.

B. Results

1. Any use of health care services

Table IV.3 presents the results from regression analyses looking at changes in the likelihood of a child having at least one visit for hospital, outpatient, or dental services. The estimates presented in columns 1 and 4 represent the estimated change in the probability of any utilization for stairstep children; column 1 represents the impact associated with the transition year and column 4 the impact associated with the post-transition year.

Overall, the New York estimates provide a mixed picture of the direction and magnitude of impacts associated with the transition from separate CHIP to Medicaid (Table IV.3). Dental care represents the sole dimension of utilization along which we find large, statistically significant increases in service use. Importantly, large positive increases in use of dental care are also present for Colorado, providing compelling substantiating evidence. The stairstep transition also appeared to result in a small (less than 3 percent) but statistically significant decrease in the

[8] In many states, managed care arrangements do not generate claims for service use in the same way as fee-for-service arrangements. In these instances, states must rely on health plans to generate and submit pseudo claims to capture complete information on service use occurring under managed care. States that contract with managed care entities to deliver Medicaid and CHIP services typically require those entities to report encounter data to the state so that the state has a full record of all of the services for which it is paying; states are required by federal law to submit their Medicaid eligibility and claims data electronically to the Centers for Medicare & Medicaid Services (CMS) through the Medicaid Statistical Information System. However, not all states have done so. Because states typically do not pay providers directly for services under a managed care arrangement, there is often less information about the quality and completeness of the data reported by managed care entities. Unlike Colorado CHIP, Medicaid in Colorado is largely fee for service, in which providers receive payment from the state by submitting a claim, so we would not expect the same potential underreporting issue that appears to be present in the encounter data.

likelihood of receiving any well-child visit, an effect that slightly diminished over time. In contrast, the transition was not associated with meaningful changes in the likelihood of having any type of ambulatory visit. Nor were there statistically significant impacts for the likelihood of receiving care in the ED. Although the coefficient estimates representing impacts for inpatient utilization imply large percentage changes over the pooled baseline average (columns 2 and 5), they are estimated imprecisely, as is often the case with very infrequent utilization events. Thus, the decreases in inpatient care associated with the transition more likely reflect random fluctuations in infrequently occurring events rather than true program impacts.

a. Dental care

In Colorado, we find large, increases in dental use for stairstep children in Medicaid relative to CHIP. The transition was associated with a large, statistically significant increase in the probability of having one dental visit during both the transition year and post-transition year. The transition year was associated with a 3.8 percentage point increase of any dental care receipt during the period ($p < 0.01$), growing to a 6.5 percentage point increase in the post-transition year ($p < 0.01$). These represent a 5.3 percent increase and a 9.0 percent increase in care receipt, respectively, compared to the pooled baseline average.

In New York, we find evidence that the move from separate CHIP to Medicaid was associated with an increase in the likelihood of having at least one dental visit. Although we do not see a statistically significant impact on any dental use associated with the transition year, the estimated coefficient on the post-transition year implies a 4.2 percentage point increase in dental receipt ($p < 0.01$). It represents a 6.5 percent increase in service use compared to the pooled baseline average.

b. Hospital-based care (inpatient admissions and ED visits)

There were no meaningful changes in the likelihood of receiving hospital-based care associated with the transition. Although there was a large estimated percentage increase in inpatient admissions over the pooled baseline average associated with the post-transition year, this increase is due to the fact that inpatient admissions are infrequent and more likely to register slight variations in service use (only 1.4 percent of children had an inpatient admission based on the pooled pre-transition year average). Estimated coefficients on the probability of using ED care are small and not statistically significant.

c. Outpatient care (ambulatory care and well-child visits)

We find small reductions for stairstep children in their probability of having a well-child visit in the two years after the start of the transition. There is an estimated 1.6 percentage point reduction ($p < 0.01$) in the likelihood of having at least one well-child visit in the transition year. The magnitude of the estimated reduction was smaller in the post-transition year (0.9 percentage points) but remained statistically significant at the $p < 0.05$ level. In the model estimating effects

Table IV.3. Effects of stairstep transition on health care use, any visits

Outcome	Transition year[a]			Post-transition year[b]		
	(1) Estimated impact (standard error)	(2) Percentage difference	(3) *p*-value	(4) Estimated impact (standard error)	(5) Percentage difference	(6) *p*-value
Colorado						
Any dental visits	0.038*** (0.008)	5.3%	<0.001	0.065*** (0.008)	9.0%	<0.001
New York						
Any inpatient admissions	-0.001 (0.001)	-4.6%	0.509	-0.002** (0.001)	-14.3%	0.041
Any ED visits	0.005 (0.003)	2.1%	0.153	0.003 (0.003)	1.4%	0.345
Any ambulatory visits	-0.002 (0.003)	-0.3%	0.329	-0.001 (0.003)	-0.1%	0.697
Any well-child visits	-0.016*** (0.004)	-2.6%	<0.001	-0.009** (0.004)	-1.5%	0.018
Any dental visits	0.001 (0.004)	0.2%	0.722	0.042*** (0.004)	6.5%	<0.001

Source: Analysis of linked Medicaid and CHIP enrollment, claims, and encounter data provided by Colorado Department of Health Care Policy and Financing and New York State Department of Health.

Notes: The results of each outcome are based on a difference-in-differences regression model, as described in the text. All Colorado regressions include 5,259 treatment group children and 123,218 comparison group children; all New York regressions include 25,338 treatment group children and 340,653 comparison group children. The treatment group includes all children who were continuously covered in Medicaid and CHIP for the three-year analysis period and met the intent-to-treat criteria for the treatment group—that is, during the baseline year they were at least five years of age, enrolled for a minimum of six months in the CHIP program, and had family income between 100 and 138 percent of the FPL. The comparison group includes all children who met the intent-to-treat criteria for the comparison group and were continuously covered in Medicaid and CHIP for the three-year analysis period. See Section III.C.1 for details.

Percentage difference is calculated as the regression-adjusted difference between the treatment and comparison group, divided by the pooled pre-transition (baseline year) average.

[a] The transition year in Colorado was January 1, 2013 to December 31, 2013; in New York, it was November 1, 2011 to October 31, 2012.

[b] The post-transition year in Colorado was January 1, 2014 to December 31, 2014; in New York, it was November 1, 2012 to October 31, 2013.

*/**/*** Significantly different from zero at the .10/.05/.01 levels, respectively.

ED = emergency department.

on the likelihood of having at least one ambulatory visit, inclusive of both well-child visits and all other ambulatory visits during the year, coefficients on the transition and post-transition year indicator are small and not statistically significant.

2. Number of health care services

To assess whether the transition from CHIP to Medicaid affected the amount of service use, we measured utilization as the number of yearly well-child, ambulatory, ED, inpatient, and dental visits. The results are presented in Table IV.4. We report estimates as incidence rate ratios (IRR), which measure differences in the rate of the average number of visits per year for the transition year (column 1) and post-transition year (column 3) relative to the baseline.

As with results for any service use, our analysis suggests that the transition of stairstep children from separate CHIP is associated with large and statistically significant increases in the number of dental visits in both Colorado and New York; and with a small but statistically significant reduction in the number of ambulatory visits in New York. For hospital-based outcomes, we see no statistically significant change ($p < 0.05$) in the number of overnight hospital stays or ED visits after the transition.

Table IV.4. Effects of stairstep transition on health care use, number of visits

	Transition year[a]		Post-transition year[b]	
	(1)	(2)	(3)	(4)
Outcome	Incidence rate ratio (standard error)	*p*-value	Incidence rate ratio (standard error)	*p*-value
Colorado				
Number of dental visits	1.232*** (0.022)	<0.001	1.403*** (0.025)	<0.001
New York				
Number of inpatient admissions	0.954 (0.095)	0.635	0.874 (0.093)	0.206
Number of ED visits	1.018 (0.020)	0.367	1.004 (0.020)	0.831
Number of ambulatory visits	0.979*** (0.006)	<0.001	0.977*** (0.006)	<0.001
Number of well-child visits	0.985** (0.007)	0.037	0.995 (0.007)	0.493
Number of dental visits	1.006 (0.008)	0.482	1.156*** (0.010)	<0.001

Source: Analysis of linked Medicaid and CHIP enrollment, claims, and encounter data provided by Colorado Department of Health Care Policy and Financing and New York State Department of Health.

Notes: The results of each outcome are based on a difference-in-differences regression model, as described in the text. All Colorado regressions include 5,259 treatment group children and 123,218 comparison group children; all New York regressions include 25,338 treatment group children and 340,653 comparison group children. The treatment group includes all children who were continuously covered in Medicaid and CHIP for the three-year analysis period and met the intent-to-treat criteria for the treatment group—that is, during the baseline year they were at least five years of age, enrolled for a minimum of six months in the CHIP program, and had family income between 100 and 138 percent of the FPL. The comparison group includes all children who met the intent-to-treat criteria for the comparison group and were continuously covered in Medicaid and CHIP for the three-year analysis period. See Section III.C.1 for details.

Percentage difference is calculated as the regression-adjusted difference between the treatment and comparison group, divided by the pooled pre-transition (baseline year) average.

[a]The transition year in Colorado was January 1, 2013 to December 31, 2013; in New York, it was November 1, 2011 to October 31, 2012.

[b]The post-transition year in Colorado was January 1, 2014 to December 31, 2014; in New York, it was November 1, 2012 to October 31, 2013.

*/**/*** Significantly different from zero at the .10/.05/.01 levels, respectively.

ED = emergency department.

This analysis suggests large and statistically significant increases in the number of dental visits in the post-transition year in both Colorado and New York. For example, in New York the number of dental visits are estimated to have increased by 16 percent for transition children in the first full year after the transition period. Whereas there is no evidence of an impact on the rate of dental use associated with the transition year in New York, we do find a large, statistically significant increase in the rate of dental use associated with the transition year in Colorado. As discussed above, enrollment patterns (displayed in Table IV.2) suggest that the rollout of the transition appears to have differed across the two states, with the stairstep children in Colorado spending more time enrolled in the Medicaid program during the transition year relative to the treatment group in New York.

We find a small and statistically significant decline in the number of ambulatory visits (any type) associated with the transition: a 2 percent decrease in the number of yearly visits for stairstep children ($p < 0.05$). We see a similar reduction in the number of well-child visits associated with the transition year ($p < 0.05$), however this estimated decline in well-child visits is not sustained in the post-transition year.

3. Subgroup results

We next present results from a series of subgroup analyses to test for the presence of differential impacts of the transition across key beneficiary characteristics at baseline. We tested for differential effects of the transition by age group (ages 6 to 8, 9 to 11, and 12 to 16); race (white, black, and Hispanic); and geographic location (urban versus rural).[9] Appendix Tables A.2–A.4 provide detailed data from the subgroup analyses.

Our analysis suggests there is variation in effects of the transition on dental and well-child use based on certain child and family characteristics, although these results are not conclusive. In Colorado, the greatest increases in dental use were concentrated among white and Hispanic children; however, there is no evidence of meaningful racial differences in dental use for the New York sample. The observed small reductions in well-child visits associated with the transition in New York appear to be concentrated among older white children. There is little variation by age, race/ethnicity, or urban/rural location in the effects on the transition on the likelihood of having at least one ambulatory visit, ED visit, or inpatient visit.

a. Age group

In both Colorado and New York, the increase in the likelihood of using dental care associated with the post-transition period were large and statistically significant for all three age groups examined. In New York, those in the youngest age group had the greatest increase in use of dental care after the transition. Specifically, there was a 6.1 percentage point increase in the likelihood of 6- to 8- year olds having a dental visit in the post-transition year relative to the baseline year, compared to estimated increases of 3.9 percentage points and 3.6 percentage points among 9- to 11-year-olds and 12- to 16-year-olds, respectively. In Colorado, the youngest

[9] We use the Office of Management and Budget county-based definition of rural areas to define a county as urban versus rural (see, for example: https://coruralhealth.org/wp-content/uploads/2013/10/2014.Colorado-County-Designations.pdf).

and oldest age groups experienced comparable increases (7.5 percentage points and 7.1 percentage points, respectively), whereas the middle age group experienced a somewhat smaller increase (5.0 percentage points).

Reductions in any well-child visits of 1.0 to 1.9 percentage points were observed for children ages 9 to 12 and 12 to 16 during the transition and post-transition years; in contrast, no statistically significant impacts on well-child visits in either period emerged for the youngest children (ages 6 to 8). We observed no statistically significant impacts of the transition on ED visits in our main models; in the age-stratified models, there was no meaningful impact on ED visits in the transition year for any of the three age groups, but the post-transition year was associated with a 1.8 percentage point increase in ED visits ($p < 0.05$) for the youngest children (ages 6 to 8). As in the main models, we observed no statistically significant ($p < 0.05$) impacts for the likelihood of receiving inpatient care or having any type of ambulatory visit.

b. Race

Subgroup estimates provide mixed evidence of differential impacts in the likelihood of receiving dental care across racial groups. In Colorado, whites and Hispanics experienced large and statistically significant increases in the likelihood of using dental care associated with both the transition year (5.1 and 7.6 percentage points, respectively) and post-transition year (8.9 and 11.6 percentage points). The estimated increases in the likelihood of using of dental care for black children were substantially smaller (1.0 in the transition year and 2.5 percentage points in the post-transition year) and not statistically significant. In contrast, increases in use of dental care in New York were similarly large in the post-transition year across all race/ethnicity groups.

The estimated impacts of the transition on the likelihood of having well-child visits appear to be concentrated among white children. Reductions in the proportion of white children with any well-child visits were large and statistically significant. In the transition year, there was a 2.4 percentage point reduction in the likelihood of white children having any well-child visits, and a 2.0 percentage point reduction in the post-transition year (both statistically significant at $p < 0.01$). Estimated reductions among both black and Hispanic children were smaller, and the standard errors were large, thus offering no statistical confidence that the estimated impact is different from zero in these subgroups. There were no meaningful differences by race for the likelihood of having ED visits or any type of ambulatory visit; in all models, the estimated coefficients on the post-transition year were small and not statistically different from zero.

c. Urban/rural

We observed few differences in estimated impacts between urban and rural children. For all outcomes, the magnitude of the percentage point differences was small, suggesting relatively similar experiences across the two groups.

Table IV.5. Effects of stairstep transition on any visits, fully restricted sample (treatment on treated)

Outcome	Transition year[a]			Post-transition year[b]		
	Estimated impact (standard error)	Percentage difference	*p*-value	Estimated impact (standard error)	Percentage difference	*p*-value
Colorado						
Any dental visits	0.040** (0.018)	5.6%	0.021	0.069 (0.018)	9.6%	<0.001
New York						
Any inpatient admissions	-0.002 (0.002)	-12.1%	0.403	-0.003 (0.002)	-22.8%	0.127
Any ED visits	0.008 (0.007)	3.6%	0.264	0.003 (0.007)	1.3%	0.686
Any ambulatory visits	-0.007 (0.006)	-0.9%	0.155	-0.011** (0.006)	-1.3%	0.035
Any well-child visits	-0.024*** (0.009)	-3.9%	0.008	-0.017** (0.009)	-2.8%	0.049
Any dental visits	0.005 (0.008)	0.8%	0.515	0.050*** (0.008)	7.9%	<0.001

Source: Analysis of linked Medicaid and CHIP enrollment, claims, and encounter data provided by Colorado Department of Health Care Policy and Financing and New York State Department of Health.

Notes: The results of each outcome are based on a difference-in-differences regression model, as described in the text. All Colorado regressions include 967 treatment group children and 91,574 comparison group children; all New York regressions include 4,934 treatment group children and 301,575 comparison group children. The treatment group includes all children who were continuously covered in Medicaid and CHIP for the three-year analysis period and met the treatment-on-treated criteria for the treatment group—that is, during the baseline year they were at least five years of age, enrolled for a minimum of six months in the CHIP program, had family income between 100 and 138 percent of the FPL, and during the post-transition year were enrolled in Medicaid for all 12 months and had family income between 100 and 138 percent of the FPL. The comparison group includes all children who met the treatment-on-the-treated criteria for the comparison group and were continuously covered in Medicaid and CHIP for the three-year analysis period. See Section III.C.1 for details.

Percentage difference is calculated as the regression-adjusted difference between the treatment and comparison group, divided by the pooled pre-transition (baseline year) average.

[a] The transition year in Colorado was January 1, 2013 to December 31, 2013; in New York, it was November 1, 2011 to October 31, 2012.

[b] The post-transition year in Colorado was January 1, 2014 to December 31, 2014; in New York, it was November 1, 2012 to October 31, 2013.

*/**/*** Significantly different from zero at the .10/.05/.01 levels, respectively.

ED = emergency department.

4. Alternative samples—transitioned group (treatment on treated)

A treatment on treatment analysis is an important complement to the intent to treat analysis presented above. Because the former includes all children identified at baseline as eligible for the transition to Medicaid, its effects could be potentially muted by the experiences of children eligible for the transition in the baseline period who ultimately stayed enrolled in CHIP due to changes in family income or other determinants of eligibility. Accordingly, it is instructive to analyze the experiences of children who were indeed ultimately transitioned to Medicaid. Our ToT sample comprised children continuously enrolled in Medicaid in the year *following* the transition period and whose family income was between 100 to 138 percent of the FPL—in other words, those children who would have been eligible and presumably enrolled in CHIP in the absence of the policy change. This sample is considerably smaller than the ITT sample because we excluded children with *any* CHIP coverage during the post transition year (because their family income was above the 138 percent of the FPL threshold), as well as those Medicaid enrolled children whose family income was not in the stairstep income range for any month in the post-transition year (because their family income was below the 100 percent of the FPL).

As shown in Table IV.5, the ToT estimates of the impact of the stairstep transition exhibit a similar pattern to the ITT estimates in New York: large, positive increases in the probability of any dental use, small reductions in the probability of any well-child visits for stairstep children in the post-transition year, and no change in use of hospital-based care. Estimates for the ToT sample are of a larger magnitude over what was observed for the ITT sample (for dental visits, the regression-adjusted difference between the treatment and estimated counterfactual associated with the post-transition year is 5.0 percentage points, compared to a 4.2 percentage point increase observed in the ITT sample [Table IV.3]). This finding suggests that stairstep children who transitioned into full-year Medicaid coverage (at 100 to 138 percent of the FPL) experienced greater impacts on well-child and dental care relative to stairstep children whose post-transition coverage status included at least some CHIP coverage or Medicaid coverage at a lower income threshold. We also see for the first time suggestive evidence that the transition may have affected the probability of having any ambulatory visits although the impact was small; in the post-transition year, there was a 1.1 percentage point reduction in any ambulatory visits ($p < 0.05$).

In Colorado, the ToT estimates, in keeping with the ITT estimates, suggest that the transition was associated with increases to the likelihood of receiving dental services. The ToT estimates are slightly greater than the ITT estimates, however the difference between the two is not as pronounced as with the New York estimates. This is consistent with the enrollment history patterns observed in Table IV.1, where we observed a greater proportion of the children eligible for the transition actually transitioned in Colorado than New York.

Estimates of changes in the number of visits associated with the transition for the ToT sample (Table IV.6) are similar to the ITT sample. Stairstep children experienced an increase in the amount of dental visits and a decline in the amount of ambulatory visits during the post-transition periods. The IRRs for dental and ambulatory visits are slightly greater in the ToT sample than those from the ITT sample (Table IV.4).

Table IV.6. Effects of stairstep transition on number of visits, fully restricted sample (treatment on treated)

Outcome	Transition year[a]		Post-transition year[b]	
	Incidence rate ratio (standard error)	*p*-value	Incidence rate ratio (standard error)	*p*-value
Colorado				
Number of dental visits	1.264*** (0.051)	<0.001	1.490*** (0.059)	<0.001
New York				
Number of inpatient admissions	0.849 (0.162)	0.389	0.816 (0.168)	0.322
Number of ED visits	1.005 (0.043)	0.901	1.002 (0.044)	0.972
Number of ambulatory visits	0.961*** (0.012)	0.002	0.970** (0.014)	0.031
Number of well-child visits	0.979 (0.015)	0.180	0.986 (0.015)	0.355
Number of dental visits	1.025 (0.019)	0.187	1.249*** (0.024)	<0.001

Source: Analysis of linked Medicaid and CHIP enrollment, claims, and encounter data provided by Colorado Department of Health Care Policy and Financing and New York State Department of Health.

Notes: The results of each outcome are based on a difference-in-differences regression model, as described in the text. All Colorado regressions include 967 treatment group children and 91,574 comparison group children; all New York regressions include 4,934 treatment group children and 301,575 comparison group children. The treatment group includes all children who were continuously covered in Medicaid and CHIP for the three-year analysis period and met the treatment-on-treated criteria for the treatment group—that is, during the baseline year they were at least five years of age, enrolled for a minimum of six months in the CHIP program, had family income between 100 and 138 percent of the FPL, and during the post-transition year were enrolled in Medicaid for all 12 months and had family income between 100 and 138 percent of the FPL. The comparison group includes all children who met the treatment-on-treated criteria for the comparison group and were continuously covered in Medicaid and CHIP for the three-year analysis period. See Section III.C.1 for details.

Percentage difference is calculated as the regression-adjusted difference between the treatment and comparison group, divided by the pooled pre-transition (baseline year) average.

[a] The transition year in Colorado was January 1, 2013 to December 31, 2013; in New York, it was November 1, 2011 to October 31, 2012.

[b] The post-transition year in Colorado was January 1, 2014 to December 31, 2014; in New York, it was November 1, 2012 to October 31, 2013.

*/**/*** Significantly different from zero at the .10/.05/.01 levels, respectively.

ED = emergency department.

5. Alternative samples—four-year sample

To better understand the mechanism through which the transition may have affected health care service use, we extended the study period to cover four years—the year before the start of the state's stairstep transition (the baseline year), the year the stairstep transition was implemented in each state (transition year), and two years following the transition year (first and second post-transition years). The addition of a second post-transition year allowed us to assess whether changes observed in the three-year sample were short-term adjustments to the change in

programs versus permanent changes in children's service use that would reflect differences in benefit structures, co-payments, or provider participation across the two programs.[10]

Results from this analysis are displayed in Tables IV.7 and IV.8. In both New York and Colorado, we find that the increased use of dental services for treatment children was sustained through the second year after the transition. In Colorado, the increase in the likelihood of having a dental visit in the second year after the transition (6.4 percentage points) was similar to the estimated increase in the post-transition year (6.8 percentage points). In New York, the estimated increase in the second year after transition is essentially the same as that on the transition-year. Similarly, the small, statistically significant decrease in the probability of having at least one well-child visit in the post-transition year (1.1 percentage points) was also sustained through the second year of the transition (1.6 percentage points). Estimates on the number of visits have a similar pattern over time (Table IV.8).

6. Specification checks

The results from a series of specification checks provide confidence that the main results are not driven by the criteria used for constructing the treatment and comparison groups. In Appendix Table A.5, we consider a range of alternative specifications with respect to how the treatment and comparison groups are defined. In columns 2 and 3, we vary the required length of time a child needed to be enrolled in the stairstep income range during the baseline period to be included into the treatment group. Column 4 replicates our primary specifications with an expanded sample that allows for children not enrolled in Medicaid for all 36 months in our data. In this sample, we allow for children to drop out of public coverage for a maximum of three months per year and still be included in the analytic sample. In column 5, we investigate the sensitivity of our results to the choice of comparison group by restricting the comparison group used in Colorado to children enrolled in Medicaid between 60–100 percent of the FPL (removing children from the lowest income families from our comparison group).

Findings for these checks mirror closely those from the main models (column 1). We continue to see a strong positive impact of the transition on dental use in both Colorado and New York, with estimates ranging from a 4 to 7 percentage point increase in the post-transition year. Estimates across all but one of the sensitivity analyses are suggestive of a 1 to 3 percentage point decrease in the likelihood of receiving any well-child visit. As with the main results, results from the specification checks provide no evidence that the transition was associated with meaningful changes in the likelihood of having any type of ambulatory visit, ED visit, or inpatient visit. The consistency of the parameter estimates across the main specification and all four specification checks provides important reassurance that the results are indeed driven by the true impact of the transition as opposed to a particular set of modeling assumptions.

[10] The sample size for these models differs from the main specification due to the exclusion of children who did not satisfy the four-year continuous public coverage criteria for inclusion, either because they aged out of the sample or experienced a period without coverage during the additional (second post-transition) year. This loss of sample is why we did not use the four-year sample as our main specification, preferring the three-year sample.

Table IV.7. Effects of stairstep transition on any visits, four-year sample

Outcome	Transition year[a]			Post-transition year[b]			Second year after transition[c]		
	Estimated impact (standard error)	Percentage difference	*p*-value	Estimated impact (standard error)	Percentage difference	*p*-value	Estimated impact (standard error)	Percentage difference	*p*-value
Colorado									
Any dental visits	0.041*** (0.008)	5.7%	<0.001	0.068*** (0.009)	9.3%	<0.001	0.063*** (0.009)	8.7%	<0.001
New York									
Any inpatient admissions	-0.001 (0.001)	-5.5%	0.498	-0.002** (0.001)	-18.3%	0.023	-0.003*** (0.001)	-24.7%	0.003
Any ED visits	0.004 (0.004)	1.6%	0.328	0.005 (0.004)	2.2%	0.803	-0.003 (0.004)	-1.3%	0.443
Any ambulatory visits	-0.002 (0.003)	-0.2%	0.502	0.000 (0.003)	0.0%	0.917	-0.002 (0.003)	-0.3%	0.420
Any well-child visits	-0.018*** (0.005)	-2.8%	<0.001	-0.011** (0.005)	-1.8%	0.013	-0.016*** (0.005)	-2.5%	<0.001
Any dental visits	-0.000 (0.004)	0.0%	0.965	0.047*** (0.004)	7.2%	<0.001	0.048*** (0.004)	7.4%	<0.001

Source: Analysis of linked Medicaid and CHIP enrollment, claims, and encounter data provided by Colorado Department of Health Care Policy and Financing and New York State Department of Health.

Notes: The results of each outcome are based on a difference-in-differences regression model, as described in the text. All Colorado regressions include 4,401 treatment group children and 105,757 comparison group children; all New York regressions include 19,242 treatment group children and 280,560 comparison group children. The treatment group includes all children who were continuously covered in Medicaid and CHIP for the four-year analysis period and met the intent-to-treat criteria for the treatment group—that is, during the baseline year they were at least five years of age, enrolled for a minimum of six months in the CHIP program, and had family income between 100 and 138 percent of the FPL. The comparison group includes all children who met the intent-to-treat criteria for the comparison group and were continuously covered in Medicaid and CHIP for the four-year analysis period. See Section III.C.1 for details.

Percentage difference is calculated as the regression-adjusted difference between the treatment and comparison group, divided by the pooled pre-transition (baseline year) average.

[a] The transition year in Colorado is January 1, 2013 to December 31, 2013; in New York it is November 1, 2011 to October 31, 2012.

[b] The post-transition year in Colorado was January 1, 2014 to December 31, 2014; in New York, it was November 1, 2012 to October 31, 2013.

[C] The second year after transition year in Colorado was January 1, 2015 to December 31, 2015; in New York, it was November 1, 2013 to October 31, 2014.

*/**/*** Significantly different from zero at the .10/.05/.01 levels, respectively.

ED = emergency department.

Table IV.8. Effects of stairstep transition on number of visits, four-year sample

Outcome	Transition year[a]		Post-transition year[b]		Second year after transition [c]	
	Incidence rate ratio (standard error)	*p*-value	Incidence rate ratio (standard error)	*p*-value	Incidence rate ratio (standard error)	*p*-value
Colorado						
Number of dental visits	1.265*** (0.024)	<0.001	1.492*** (0.027)	<0.001	1.408*** (0.029)	<0.001
New York						
Number of inpatient admissions	0.920 (0.108)	0.481	0.742** (0.088)	0.011	0.714*** (0.089)	0.007
Number of ED visits	1.008 (0.023)	0.715	1.006 (0.023)	0.803	0.996 (0.023)	0.153
Number of ambulatory visits	0.975*** (0.006)	<0.001	0.974*** (0.007)	<0.001	0.963*** (0.008)	<0.001
Number of well-child visits	0.983** (0.008)	0.030	0.992 (0.008)	0.328	0.992 (0.008)	0.314
Number of dental visits	0.997 (0.009)	0.758	1.139*** (0.011)	<0.001	1.185*** (0.012)	<0.001

Source: Analysis of linked Medicaid and CHIP enrollment, claims, and encounter data provided by Colorado Department of Health Care Policy and Financing and New York State Department of Health.

Notes: The results of each outcome are based on a difference-in-differences regression model, as described in the text. All Colorado regressions include 4,401 treatment group children and 105,757 comparison group children; all New York regressions include 19,242 treatment group children and 280,560 comparison group children. The treatment group includes all children who were continuously covered in Medicaid and CHIP for the four-year analysis period and met the intent-to-treat criteria for the treatment group—that is, during the baseline year they were at least five years of age, enrolled for a minimum of six months in the CHIP program, and had family income between 100 and 138 percent of the FPL. The comparison group includes all children who met the intent-to-treat criteria for the comparison group and were continuously covered in Medicaid and CHIP for the four-year analysis period. See Section III.C.1 for details.

Percentage difference is calculated as the regression-adjusted difference between the treatment and comparison group, divided by the pooled pre-transition (baseline year) average.

[a] The transition year in Colorado is January 1, 2013 to December 31, 2013; in New York it is November 1, 2011 to October 31, 2012.

[b] The post-transition year in Colorado was January 1, 2014 to December 31, 2014; in New York, it was November 1, 2012 to October 31, 2013.

[C] The second year after transition year in Colorado was January 1, 2015 to December 31, 2015; in New York, it was November 1, 2013 to October 31, 2014.

*/**/*** Significantly different from zero at the .10/.05/.01 levels, respectively.

ED = emergency department.

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V. DISCUSSION

Among the ACA's many changes to the U.S. health care system, one of the least studied was its impact on children ages 6 to 18 from families with incomes between 100 and 138 percent of the FPL. Although Medicaid eligibility levels for children younger than 6 were not affected, states covering older children with family incomes between 100 and 138 percent of the FPL under a separate CHIP plan were required to transition those children from separate CHIP to Medicaid by January 1, 2014. Although this change may have been viewed as minor in comparison to many of the ACA's more publicized provisions, such as the Medicaid expansion to adults and the newly created health insurance Marketplaces, it required more than half a million children in 21 states to switch programs. In most states, the change in programs required some families to learn about different benefit packages, choose new health plans and providers, and understand new renewal procedures to keep their child covered. To date there have been no rigorous studies of how the transition from separate CHIP to Medicaid affected stairstep children's use of health care.

Using a quasi-experimental design, this study estimated the impact of the stairstep transition on children's use of health care in two early adopting states—Colorado and New York. The estimated impacts of the transition are mixed. We consistently find large increases in dental use for stairstep children after the transition in both states. In both Colorado and New York, stairstep children were more likely to have had at least one dental visit after the transition to Medicaid than when they were enrolled in separate CHIP. The estimates represent a 4.2 percentage point increase in New York and a 6.5 percentage point increase in Colorado associated with the post-transition period. We similarly find large and statistically significant impacts when looking at the number of dental visits.

Our results also suggest that the transition in New York may have negatively affected access to outpatient care. In New York, the transition was associated with a small (less than 3 percent) but statistically significant decrease in the likelihood of receiving any well-child visit among stairstep children. The transition appears not to have affected the count of such visits, perhaps due to the infrequency of children in this age having more than one well-child visit per year. In addition, although there was no change in the likelihood of having any type of physician visit after the transitions relative to before it, there was a small (2 percent) decrease in the number of ambulatory visits among stairstep children.

Alternative sample analyses conducted help validate the results for the overall sample of children, and suggest that the estimated impacts of the transition were more likely due to structural differences between the two programs than to short-term adjustments of moving to a new program. The observed impacts on dental care and use of outpatient services were robust to using a sub-sample of children that ultimately transitioned to Medicaid. The estimates of the change in use of services by children who actually transitioned to Medicaid were slightly greater than those for the overall sample, which included all children eligible to transition even if they did not ultimately do so. This suggests that stairstep children who transitioned into full-year Medicaid coverage (at 100 to 138 percent of the FPL) experienced greater impacts on service relative to stairstep children may not have transitioned to Medicaid. The observed impacts on service use also persisted over time. When we extended the study period by including a second

post-transition year, we found the estimated increases in dental use and reductions in well-child visits were sustained through that year.

Subgroup findings suggest that the estimated gains and losses were not always the same across different groups of children. Findings from New York suggest that the reduction in well-child visits was concentrated among older white children. Additionally, although we observed little variation across race/ethnicity in the estimated impact of the transition on dental use in New York, in Colorado, the large estimated increases in dental use associated with the transition did not seem to be shared by black children.

Taken together, these results suggest that there are differences between separate CHIP and Medicaid that affect children's access to care, at least in some states. In Colorado, the increase in dental use after the switch was likely due in large part to the existence of cost sharing for those services in CHIP, but not in Medicaid. The increase in dental visits in New York is harder to explain, as there are no co-payments or deductibles for children enrolled in CHIP or Medicaid, and the health plans and provider networks are nearly identical across the two programs.[11] It may be that despite comparable provider networks across the two programs, differences exist in the portion of providers accepting new patients and/or scheduling an appointment. We explored this possibility by using the InsureKidsNow.gov dentist locator to compare the availability of dental providers between the two programs.[12] Although similar numbers of dental providers are listed as participating in CHIP managed care and Medicaid managed care in New York, dentists participating in Medicaid were more likely to be accepting new patients than those participating in CHIP. For example, a search of New York dental providers resulted in 658 listed CHIP dental providers and 654 listed in Medicaid; however, when we restricted the search to providers accepting new patients, we were left with 205 CHIP providers and 637 in Medicaid. These results suggest that access barriers go beyond price and provide further support for efforts to ensure adequate participation of providers of all types in state Medicaid and CHIP programs.

Our study has several limitations. The first and most obvious is that these findings may not be generalizable to other states or populations. This study was limited to just 2 of the 21 states that transitioned children and, because of data limitations, we were able to study only dental outcomes in Colorado. This restriction limits the generalizability of our results: the impact of other states' transition experiences on children's use of services might differ importantly from the findings from this study. This limitation might be especially true for states that (1) transitioned the stairstep population all at the same time rather than the transition-at-renewal approach used by both Colorado and New York, (2) have differences in delivery systems between the two programs, or (3) show less overlap between the two programs in participating managed care organizations or provider networks.

Second, the transition could have affected outcomes that were outside of the scope of this study. For example, given data and sample size limitations, we were unable to study the impact of the transition on the high-need population, or on specialist care or disease-specific services.

[11] This conclusion is supported by findings from previous research in Buffalo, New York, which found primary care provider networks in Medicaid and separate CHIP to be nearly identical (Orfield et al. 2014).

[12] Available at https://www.insurekidsnow.gov/state/ny/find-a-dentist/index.html.

This population and these services may be more sensitive to changes in program types, so impacts of the transitions for these populations and services might be quite different than those observed in this study.

Third, our analysis was affected by data quality issues. In both states, and across both programs, it is impossible to be sure that all visits were captured because some providers may have provided charity care without seeking reimbursement. The direction of the bias due to the omission of these visits is unclear. In Colorado, given the observed differences in medical care service use calculated from the data provided by the state for children enrolled in the Medicaid program and for children enrolled in the separate CHIP program, we concluded that any estimates of the transition's impact on these measures were likely to be confounded by reporting differences across the two programs and thus grossly overstated. For this reason, we did not assess the impact of Colorado's stairstep transition on inpatient, ED, and outpatient services. Because we did not have reason to doubt the completeness of the dental service data, we were able to analyze the effect of the transition on dental services in Colorado. If dental visits were in fact underreported, it would lead to upwardly biased results of the transition on dental services. Although the pre-transition rates of dental care under CHIP were similar to national rates, thus providing reassurance on the quality of the data, the magnitude of the Colorado-specific results should be viewed with caution.

Despite these limitations, the findings from this study make important contributions to our understanding about children's access to care under state separate CHIP and Medicaid programs. To our knowledge, this is the first study to document the outcomes of a policy change that affected more than half a million children and their families. Although the move from separate CHIP to Medicaid could be expected to benefit families in a number of ways, results from this study suggest that these transitions may have also led to small reductions in access to care for some types of services. This suggests the need for more work on examining the outcomes of the transition in other states. Additionally, results from this study can help inform any future transitions of children across sources of coverage. States may look to the stairstep transition as a test case for how to approach future coverage transitions for children enrolled in CHIP or for broader coverage transitions, as well as the potential impact of those transitions on children's service use.

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APPENDIX A

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Table A.1. Treatment and comparison group sample criteria

Criteria	Main sample	Alternative samples					
	Intent to treat	Transitioned group (treatment on treated)	4-year	3-month enrollment criteria	12-month enrollment criteria	Allow for spells of disenrollment	Alternative comparison group (Colorado only)
Time period[a]	3 years	3 years	4 years	3 years	3 years	3 years	3 years
Treatment group criteria							
Minimum number of months enrolled in separate CHIP in stairstep income range (100–138% FPL) during the baseline year)[b]	6 months	6 months	6 months	3 months	12 months	6 months	6 months
Minimum number of months enrolled in Medicaid in stairstep income range (100–138% FPL) during the post-transition year)[c]	NA	12 months	NA	NA	NA	NA	NA
Comparison group criteria							
Minimum number of months enrolled in Medicaid during the baseline year)[b]	6 months	6 months	6 months	3 months	12 months	6 months	6 months
Minimum number of months enrolled in Medicaid during the post-transition year)[c]	NA	12 months	NA	NA	NA	NA	NA
Income restriction	< 100% FPL	< 100% FPL	< 100% FPL	< 100% FPL	< 100% FPL	< 100% FPL	60 to < 100% FPL
Additional criteria applied to both treatment and comparison groups							
Minimum age in the year before the transition	At least 5 years of age	At least 5 years of age	At least 5 years of age	At least 5 years of age	At least 5 years of age	At least 5 years of age	At least 5 years of age
Coverage restriction—number of months per year enrolled in Medicaid or CHIP[d]	12 months (always enrolled)	12 months (always enrolled)	12 months (always enrolled)	12 months (always enrolled)	12 months (always enrolled)	9 months	12 months (always enrolled)
Basis of eligibility[d, e]	Always income	Always income	Always income	Always income	Always income	Always income	Always income

Source: Analysis of linked Medicaid and CHIP enrollment, claims, and encounter data provided by Colorado Department of Health Care Policy and Financing and New York State Department of Health.

Notes: Years are measured relative to the start of the transitions in Colorado (January 1, 2013) and New York (November 1, 2011).

[a] The three-year study period ran from January 1, 2012 to December 31, 2014 for Colorado, and from November 1, 2010 to October 31, 2013 in New York. The four-year study period ran from January 1, 2012 to December 31, 2015 for Colorado, and from November 1, 2010 to October 31, 2014 for New York.

[b] The baseline year in Colorado was January 1, 2012 to December 31, 2012; in New York, it was November 1, 2010 to October 31, 2011.

[c] The post-transition year in Colorado was January 1, 2014 to December 31, 2014; in New York, it was November 1, 2012 to October 31, 2013.

[d] Criteria are assessed for the full analysis period (i.e., either a three- or four-year period).

[e] Over the analysis period, if a child's basis of eligibility was ever in a non-income related category (such as pregnancy or disability), he or she was excluded from the study.

Table A.2. Effects of stairstep transition on any visits, by age

Outcome	Ages 6 to 8		Ages 9 to 11		Ages 12 to 16	
	Transition year[a]	Post-transition year[b]	Transition year[a]	Post-transition year[b]	Transition year[a]	Post-transition year[b]
Colorado						
Any dental visits						
Impact (standard error)	0.410*** (.014)	0.075*** (0.014)	0.041*** (0.013)	0.050*** (0.014)	0.033** (0.013)	0.071*** (0.013)
Percentage difference	5.5%	10.0%	5.6%	6.7%	5.0%	10.5%
Sample size	1,488 (T); 45,092 (C)		1,742 (T); 38,108 (C)		2,029 (T); 40,018 (C)	
New York						
Any inpatient admissions						
Impact (standard error)	0.004* (0.002)	-0.003 (0.002)	-0.001 (0.002)	-0.002 (0.002)	-0.002 (0.001)	-0.001 (0.002)
Percentage difference	27.6%	-19.5%	-9.2%	-19.7%	-15.4%	-9.2%
Any ED visits						
Impact (standard error)	0.010 (0.008)	0.018** (0.008)	-0.001 (0.005)	0.006 (0.005)	0.005 (0.005)	-0.005 (0.005)
Percentage difference	3.9%	7.4%	-0.1%	3.0%	2.6%	-2.4%
Any ambulatory visits						
Impact (standard error)	0.001 (0.005)	0.007 (0.005)	-0.005 (0.004)	0.001 (0.004)	-0.002 (0.004)	-0.006 (0.004)
Percentage difference	0.1%	0.8%	-0.5%	0.1%	-0.3%	-0.7%
Any well-child visits						
Impact (standard error)	-0.009 (0.010)	-0.000 (0.009)	-0.019*** (0.007)	-0.015** (0.007)	-0.016*** (0.006)	-0.010* (0.006)
Percentage difference	-1.4%	-0.6%	-3.0%	-2.3%	-2.6%	-1.6%
Any dental visits						
Impact (standard error)	0.018** (0.008)	0.061*** (0.008)	-0.004 (0.006)	0.039*** (0.006)	-0.002 (0.005)	0.036*** (0.005)
Percentage difference	2.7%	9.3%	-0.6%	6.0%	-0.3%	5.9%
Sample size	4,416 (T); 111,422 (C)		8,759 (T); 106,337 (C)		12,163 (T); 122,784 (C)	

Source: Analysis of linked Medicaid and CHIP enrollment, claims, and encounter data provided by Colorado Department of Health Care Policy and Financing and New York State Department of Health.

Notes: The results of each outcome are based on a difference-in-differences regression model, as described in the text. Separate regression models are run for each subgroup. The treatment group includes all children who were continuously covered in Medicaid and CHIP for the three-year analysis period and met the intent-to-treat criteria for the treatment group—that is, during the baseline year they were at least five years of age, enrolled for a minimum of six months in the CHIP program, and had family income between 100 and 138 percent of the FPL. The comparison group includes all children who met the intent-to-treat criteria for the comparison group and were continuously covered in Medicaid and CHIP for the three-year analysis period. See Section III.C.1 for details.

Percentage difference is calculated as the regression-adjusted difference between the treatment and comparison group, divided by the pooled pre-transition (baseline year) average.

[a] The transition year in Colorado was January 1, 2013 to December 31, 2013; in New York, it was November 1, 2011 to October 31, 2012.

[b] The post-transition year in Colorado was January 1, 2014 to December 31, 2014; in New York, it was November 1, 2012 to October 31, 2013.

*/**/*** Significantly different from zero at the .10/.05/.01 levels, respectively.

ED = emergency department.

Table A.3. Effects of stairstep transition on any visits, by race/ethnicity

Outcome	White		Black		Hispanic	
	Transition year[a]	Post-transition year[b]	Transition year[a]	Post-transition year[b]	Transition year[a]	Post-transition year[b]
Colorado						
Any dental visits						
Impact (standard error)	0.051*** (0.010)	0.089*** (0.010)	0.010 (0.015)	0.025 (0.016)	0.076** (0.036)	0.116*** (0.037)
Percentage difference	6.7%	11.5%	1.5%	3.8%	11.4%	17.4%
Sample size	2,802 (T); 67,368 (C)		1,396 (T); 29,350 (C)		236 (T); 10,722 (C)	
New York						
Any inpatient admissions						
Impact (standard error)	0.002 (0.002)	-0.000 (0.001)	0.000 (0.003)	-0.001 (0.003)	-0.002 (0.002)	-0.005** (0.002)
Percentage difference	17.5%	-0.5%	2.0%	-8.0%	-11.1%	-31.3%
Any ED visits						
Impact (standard error)	0.014*** (0.005)	0.002 (0.005)	-0.006 (0.010)	0.012 (0.010)	0.001 (0.007)	0.005 (0.007)
Percentage difference	6.6%	1.2%	-2.6%	4.6%	0.4%	2.0%
Any ambulatory visits						
Impact (standard error)	-0.003 (0.004)	-0.001 (0.004)	-0.006 (0.008)	-0.010 (0.009)	-0.003 (0.005)	0.003 (0.005)
Percentage difference	-0.3%	-0.1%	-0.8%	-1.2%	-0.4%	0.3%
Any well-child visits						
Impact (standard error)	-0.024*** (0.007)	-0.020*** (0.006)	-0.010 (0.012)	-0.011 (0.012)	-0.011 (0.008)	0.002 (0.008)
Percentage difference	-4.0%	-3.4%	-1.6%	-1.8%	-1.6%	0.2%
Any dental visits						
Impact (standard error)	-0.006 (0.006)	0.047*** (0.006)	0.015 (0.012)	0.041*** (0.012)	-0.004 (0.007)	0.036*** (0.007)
Percentage difference	-0.8%	6.9%	2.8%	7.6%	-0.5%	5.1%
Sample size	9,858 (T); 147,554 (C)		2,806 (T); 88,650 (C)		6,967 (T); 39,593 (C)	

Source: Analysis of linked Medicaid and CHIP enrollment, claims, and encounter data provided by Colorado Department of Health Care Policy and Financing and New York State Department of Health.

Notes: The results of each outcome are based on a difference-in-differences regression model, as described in the text. Separate regression models are run for each subgroup. The treatment group includes all children who were continuously covered in Medicaid and CHIP for the three-year analysis period and met the intent-to-treat criteria for the treatment group—that is, during the baseline year they were at least five years of age, enrolled for a minimum of six months in the CHIP program, and had family income between 100 and 138 percent of the FPL. The comparison group includes all children who met the intent-to-treat criteria for the comparison group and were continuously covered in Medicaid and CHIP for the three-year analysis period. See Section III.C.1 for details.

Percentage difference is calculated as the regression-adjusted difference between the treatment and comparison group, divided by the pooled pre-transition (baseline year) average.

[a] The transition year in Colorado was January 1, 2013 to December 31, 2013; in New York, it was November 1, 2011 to October 31, 2012.

[b] The post-transition year in Colorado was January 1, 2014 to December 31, 2014; in New York, it was November 1, 2012 to October 31, 2013.

*/**/*** Significantly different from zero at the .10/.05/.01 levels, respectively.

ED = emergency department.

Table A.4. Effects of stairstep transition on any visits, by urban/rural

Outcome	Urban		Rural	
	Transition year[a]	Post-transition year[b]	Transition year[a]	Post-transition year[b]
Colorado				
Any dental visits				
Impact (standard error)	0.036*** (0.008)	0.066*** (0.008)	0.050** (0.021)	0.063*** (0.022)
Percentage difference	5.0%	9.0%	7.7%	9.6%
Sample size	4,444 (T); 107,876 (C)		805 (T); 15,289 (C)	
New York				
Any inpatient admissions				
Impact (standard error)	-0.001 (0.001)	-0.002* (0.001)	0.002 (0.004)	-0.004 (0.003)
Percentage difference	-5.7%	-12.7%	21.6%	-34.1%
Any ED visits				
Impact (standard error)	0.004 (0.003)	0.003 (0.003)	0.007 (0.014)	0.003 (0.014)
Percentage difference	2.0%	1.3%	2.4%	1.0%
Any ambulatory visits				
Impact (standard error)	-0.004 (0.003)	-0.003 (0.003)	0.016 (0.010)	0.016 (0.010)
Percentage difference	-0.5%	-0.3%	1.9%	1.9%
Any well-child visits				
Impact (standard error)	-0.017*** (0.004)	-0.012*** (0.004)	-0.021 (0.016)	0.012 (0.015)
Percentage difference	-2.7%	-1.9%	-4.2%	2.4%
Any dental visits				
Impact (standard error)	0.001 (0.004)	0.041*** (0.004)	0.005 (0.013)	0.047*** (0.014)
Percentage difference	0.1%	6.4%	0.9%	8.0%
Sample size	23,746 (T); 318,338 (C)		1,815 (T);18,616 (C)	

Source: Analysis of linked Medicaid and CHIP enrollment, claims, and encounter data provided by Colorado Department of Health Care Policy and Financing and New York State Department of Health.

Notes: The results of each outcome are based on a difference-in-differences regression model, as described in the text. Separate regression models are run for each subgroup. The treatment group includes all children who were continuously covered in Medicaid and CHIP for the three-year analysis period and met the intent-to-treat criteria for the treatment group—that is, during the baseline year they were at least five years of age, enrolled for a minimum of six months in the CHIP program, and had family income between 100 and 138 percent of the FPL. The comparison group includes all children who met the intent-to-treat criteria for the comparison group and were continuously covered in Medicaid and CHIP for the three-year analysis period. See Section III.C.1 for details.

Percentage difference is calculated as the regression-adjusted difference between the treatment and comparison group, divided by the pooled pre-transition (baseline year) average.

[a] The transition year in Colorado was January 1, 2013 to December 31, 2013; in New York, it was November 1, 2011 to October 31, 2012.

[b] The post-transition year in Colorado was January 1, 2014 to December 31, 2014; in New York, it was November 1, 2012 to October 31, 2013.

*/**/*** Significantly different from zero at the .10/.05/.01 levels, respectively.

ED = emergency department.

Table A.5. Specification checks, any use of services

Outcome	(1) Main model findings (Table IV.3)		Alternative specifications							
			(2) 3-month enrollment criteria		(3) 12-month enrollment criteria		(4) Allow for spells of disenrollment		(5) Restricting comparison group to 60 to <100% FPL	
	Transition year	Post-transition year	Transition year	Post-transition year	Transition year	Post-transition year	Transition year	Post-transition year	Transition year	Post-transition Year
Colorado										
Any dental visits	0.038*** (0.008)	0.065*** (0.008)	0.033*** (0.007)	0.060*** (0.007)	0.024** (0.013)	0.037*** (0.013)	0.038*** (0.007)	0.065*** (0.007)	0.034*** (0.008)	0.063*** (0.008)
Sample sizes	5,259 (T) 123,218 (C)		7,354 (T) 124,769 (C)		1,951 (T) 111,574 (C)		6,445 (T) 137,418 (C)		5,259 (T) 38,399 (C)	
New York										
Any inpatient admissions	-0.001 (0.001)	-0.002* (0.001)	-0.000 (0.001)	-0.001 (0.001)	0.000 (0.001)	-0.002* (0.001)	-0.001 (0.001)	-0.001 (0.001)	NA	NA
Any ED visits	0.005 (0.003)	0.003 (0.003)	0.004 (0.003)	0.000 (0.003)	0.001 (0.004)	0.006 (0.004)	0.005** (0.002)	0.005* (0.002)	NA	NA
Any ambulatory visits	-0.002 (0.003)	-0.001 (0.003)	-0.003 (0.002)	-0.001 (0.002)	-0.006* (0.003)	-0.006* (0.003)	-0.001 (0.002)	-0.002 (0.002)	NA	NA
Any well-child visits	-0.016*** (0.004)	-0.009** (0.004)	-0.016*** (0.004)	-0.010*** (0.004)	-0.027*** (0.006)	-0.020*** (0.005)	-0.012*** (0.003)	-0.005 (0.003)	NA	NA
Any dental visits	0.001 (0.004)	0.042*** (0.004)	0.003 (0.003)	0.041*** (0.003)	-0.006 (0.005)	0.037*** (0.005)	0.009*** (0.003)	0.047*** (0.003)	NA	NA
Sample sizes	25,338 (T) 340,653 (C)		30,047 (T) 344,948 (C)		13,267 (T) 328,637 (C)		38,963 (T) 403,790 (C)		NA	

Source: Analysis of linked Medicaid and CHIP enrollment, claims, and encounter data provided by Colorado Department of Health Care Policy and Financing, and New York State Department of Health.

Notes: The results of each outcome are based on a difference-in-differences regression model, as described in the text. The transition year in Colorado was January 1, 2013 to December 31, 2013; in New York, it was November 1, 2011 to October 31, 2012. The post-transition year in Colorado was January 1, 2014 to December 31, 2014; in New York, it was November 1, 2012 to October 31, 2013.

*/**/*** Significantly different from zero at the .10/.05/.01 levels, respectively.

ED = emergency department; FPL = federal poverty level; NA = not available.

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