

# Adverse Selection in the Children's Health Insurance Program

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## Abstract

This study investigates whether new enrollees in the Alabama Children's Health Insurance Program have different claims experience from renewing enrollees who do not have a lapse in coverage and from continuing enrollees. The analysis compared health services utilization in the first month of enrollment for new enrollees (who had not been in the program for at least 12 months) with utilization among continuing enrollees. A second analysis compared first-month utilization of those who renew immediately with those who waited at least 2 months to renew. A 2-part model estimated the probability of usage and then the extent of usage conditional on any utilization. Claims data for 826 866 child-years over the period from 1999 to 2012 were used. New enrollees annually constituted a stable 40% share of participants. Among those enrolled in the program, 13.5% renewed on time and 86.5% of enrollees were late to renew their enrollment. In the multivariate 2-part models, controlling for age, gender, race, income eligibility category, and year, new enrollees had overall first-month claims experience that was nearly \$29 less than continuing enrollees. This was driven by lower ambulatory use. Late renewals had overall first-month claims experience that was \$10 less than immediate renewals. However, controlling for the presence of chronic health conditions, there was no statistically meaningful difference in the first-month claims experience of late and early renewals. Thus, differences in claims experience between new and continuing enrollees and between early and late renewals are small, with greater spending found among continuing and early renewing participants. Higher claims experience by early renewals is attributable to having chronic health conditions.

## Keywords

CHIP, adverse selection, health insurance, children

Adverse selection is a common occurrence in health insurance plans. People know more about their likely use of health services than do insurers and they use this knowledge to their advantage. One reason for the individual mandate in the Affordable Care Act (ACA) is that in its absence, healthier people are disproportionately less likely to enroll, leaving the plans with only the sicker individuals. Children's Health Insurance Program (CHIP) plans also potentially suffer from adverse selection. In CHIP, families pay substantially reduced premiums based on their income and are then enrolled in a stand-alone private health insurance program or in the state's Medicaid program, depending on the state. However, their enrollment and their premiums are not tied to their health status.

In CHIP, one might see adverse selection manifest itself in two ways. First, children with ongoing health problems, knowing their likely greater need of services, quickly enroll when the program becomes available to them, and they renew immediately to maintain coverage and access to their health care providers. Second, the child may experience a

serious acute health event that lands them in an emergency department or a hospital bed. In this circumstance, the family may enroll or renew their enrollment as quickly as possible to minimize additional costs, or the health care provider may assist them in doing so.

Alabama, the focus of this study, is 1 of 17 states in which CHIP participants are enrolled in stand-alone coverage. Alabama CHIP enrollees have access to the same Blue Cross Blue Shield (BCBS) of the Alabama network of providers as all other BCBS enrollees in the state. Eligibility is limited to households with income between 100% and 300% of the

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federal poverty level (FPL). Currently, an eligible family with a single child would pay a premium of \$0, \$52, or \$104 per year, depending on their income level and Native American status. Each premium provides 12 months of coverage. Even at these premiums, a majority of enrollees do not re-enroll within 12 months. However, they face no penalty for not re-enrolling and may newly enroll at anytime. Thus, it is conceivable, and perhaps likely, that adverse selection in enrollment and renewal is present in the Alabama CHIP. Such patient selection may have budgetary implications for the state and the federal government as programs expand, contract, or change significant program characteristics. Moreover, the pattern of selection, if any, has implications for the ACA.

In brief, we use Alabama CHIP claims data for the first month of enrollment or re-enrollment over the 1999 through 2012 period to identify differences in spending in total and in 5 major subcategories of expenditure. We find that new enrollees had first-month claims experience that was nearly \$29 lower per enrollee than that for those who were continuously enrolled. Late enrollees had claims experience that was approximately \$10 lower than that for those who renew immediately, controlling for other factors. Adding prior claims experience to the predicting equations for the late renewal analysis, we find that virtually all of the difference in expenditures for immediate renewals is attributable to those with chronic conditions. Thus, adverse selection exists within the Alabama CHIP program, but virtually all of it is attributable to the re-enrollment behavior of children with chronic conditions.

## Background

There is remarkably little evidence on the extent of adverse selection among children in health insurance plans. There is substantial evidence of healthier people disproportionately enrolling in closed-panel managed care plans<sup>1</sup> and of high-cost Medicare Advantage enrollees disproportionately returning to traditional Medicare.<sup>2,3</sup> The closest evidence is from studies of employer-sponsored coverage and Medigap plan purchase. Cutler and Zeckhauser survey the early literature.<sup>4</sup> More recently, Bundorf et al used data on demographics, health status, employment, and insurance coverage from the 1996 to 2002 Medical Expenditure Panel Survey (MEPS) to examine the extent of adverse selection among low-, medium-, and high-income households and coverage in small, medium, and large employer-sponsored insurance plans. They concluded that

in aggregate, the likelihood of obtaining employer-sponsored coverage nearly always increases with expected health expenditures. The positive relationship between insurance status and expected expenditures is generally consistent across the large group, medium group and small group markets. . . . [This] is consistent with a moderate amount of adverse selection.<sup>5(p30)</sup>

With respect to Medigap plans, Fang et al found that controlling for a host of factors associated with income, education, and cognitive ability, those with higher expected medical expenditures were more likely to purchase Medigap.<sup>6</sup> However, to our knowledge, no study has examined the extent of adverse selection in enrollment or re-enrollment in a public insurance program, and certainly none has examined adverse selection in a CHIP plan.

## Methodology

This study uses all claims data from the inception of the Alabama CHIP program in 1999 through 2012. We define a “new enrollee” as a child who has not been enrolled in the ALL Kids program for at least 12 months, thus including both those who are truly new to the program and those who have been out of the program for more than 12 months. A late renewal is defined as a renewal 3 to 12 months after a period of enrollment expires at the end of a prior enrollment period. We experimented with other definitions of lapsed renewal but these alternatives did not materially affect the results.

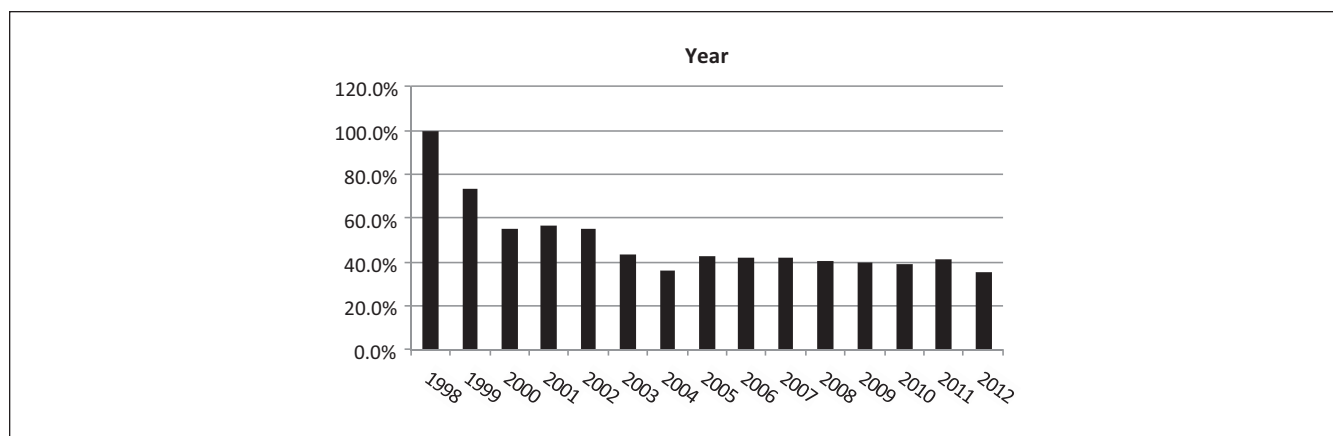
First, we describe the claims experience in the first month of enrollment for those who are new enrollees relative to those who are continuous enrollees. We do this in total and for major categories of expenditures. Similarly, we describe the claims experience of those with late renewals relative to immediate renewals. In both cases, we examine the first month of coverage claims experience to explore the extent to which enrollment may have been triggered by a health event. Expenditures throughout the study are measured in constant 2012 dollars computed using the Consumer Price Index, All Items.

Second, we estimate a series of 2-part regression models to more rigorously examine the effects of new enrollment and late renewal on first-month claims experience. A “2-part model” is used in circumstances in which there are a disproportionate number of observations with zeroes for the outcome of interest. The first part of the model estimates the decision to obtain care or not and the second estimates the extent of claims costs, given any. We estimate a logit first stage and then a log-Poisson second stage in a generalized linear model. We then recombine the results for new enrollees and for late renewals to report the policy-relevant overall impact.

The general model takes the form of the following:

$$Z_{i,t} = f \left( \begin{array}{l} \text{New / Late, Age, Age squared, Gender, Race,} \\ \text{FPL threshold, and Year} \end{array} \right),$$

where  $Z_{i,t}$  is any expenditures or the conditional amount of spending of child  $i$  in year  $t$ . The models are estimated for total spending and for spending by several major categories of care: inpatient, emergency department, specialist, hospital outpatient, and well-child visit. New/Late alternatively reflects whether the child was a new enrollee, or in separate regressions, whether he



**Figure 1.** Percentage of new enrollees in ALL Kids, by year.

Note. New enrollee is defined as the one who has not been enrolled in the prior 12 months.

or she was enrolled after a lapse in enrollment. Age and its square are included to capture potentially different health concerns in older children. Gender and race are included to explore whether there are differences in first-month expenditures by demographic factors. Race is categorized as black and other, with white as the reference category. FPL threshold refers to the child's eligibility level for benefits and is measured as three dichotomous variables: family income between 101% and 150% of the FPL, 151% and 200%, and 201% and 300%. Native American children are eligible with no premiums or co-pays and serve as the reference group.

In the late renewal analysis, we are able to introduce data on prior utilization because we have prior year data on health services use. We include a variable on whether the child had a diagnosis of a chronic condition in the prior 12 months.<sup>7</sup> (We also explored whether the advent of a new school year precipitated first-month claims experience; it did not.)

## Findings

Figure 1 shows the 15-year trend in the proportion of new enrollees. After initial years with large proportions of new enrollees, by 2003 new enrollment had stabilized at approximately 40% of enrollees. The year 2012 saw the lowest proportion of new enrollees (35%). Approximately 5.5% of children who are renewed in the program within 12 months are renewed in the first renewal month. Mean monthly enrollment is 8.3% of the annual total and there was no discernible pattern in enrollment over the year.

Table 1 shows the constant dollar mean first-month spending of new enrollees and late enrollees relative to immediately enrollees. The upper panel shows the mean expenditures including those with no first-month expenditures. Thus, the average claims cost of a new enrollee was \$111 in the first month of enrollment compared with \$139 for late enrollees and \$153 for immediate enrollees. This suggests some adverse selection on re-enrollment among those who renew

immediately. This high use is driven largely by greater hospital outpatient expenditures.

The lower panel displays the proportion of enrollees who had any first-month claims expenditures and the amount of those expenditures, conditional on having any. These measures better reflect the costs per service rather than per member per month costs at the program level. More than 28% of new enrollees used any health services in the first month of coverage compared with 34.5% of late enrollees and 41.7% of those who were immediately re-enrolled. There is also some evidence that late and immediately renewed enrollees were somewhat more likely to visit the emergency department, a specialist, and an outpatient facility than were new enrollees. Thus, there is a suggestion of adverse selection in that immediately renewed children were more likely to use services.

However, given any use, there is no suggestion of greater spending across the groups. Late renewing children had higher conditional claims experience than either new enrollees or immediately renewing ones. Given the large variances associated with these estimates, however, none of the differences are statistically significant.

Table 2 shows the estimates of the differential health expenditures of new enrollees relative to continuously enrolled children in the first column and the differential expenditures for late renewals relative to immediate renewals in next two columns.

In their first month of coverage, new enrollees have claims experience that is nearly \$29 per child lower than that for those who are continuously enrolled. This is largely driven by lower outpatient and specialist expenditures. Although they do have higher inpatient hospital claims, the \$2.38 difference is not statistically significant at the conventional levels. They do have higher expenditures for well-child visits, but the difference is only \$0.25 per child.

A similar pattern of results emerges from our examination of first-month spending by late renewals (those renewing in

**Table 1.** Mean and Standard Deviations of First-Month Claims Experience per Child by Renewal and Renewal Time.

	New enrollees		Late enrollees		Immediately renewing enrollees	
Unconditional expenditures						
	Mean (SD)		Mean (SD)		Mean (SD)	
Total	\$111 (\$938)		\$139 (\$1039)		\$153 (\$869)	
Inpatient	19 (757)		24 (846)		18 (620)	
Emergency	10 (109)		14 (161)		13 (155)	
Specialist	24 (240)		32 (256)		37 (309)	
Outpatient	45 (257)		55 (271)		63 (3,206)	
Well-child visit	3 (25)		4 (29)		2 (21)	
Conditional expenditures						
	Percent with any	Mean (SD)	Percent with any	Mean (SD)	Percent with any	Mean (SD)
Total	28.6%	\$389 (\$1725)	34.5%	\$403 (\$1739)	41.7%	\$367 (\$1316)
Inpatient	0.2	10 681 (14 218)	0.2	10 996 (14 729)	0.2	9417 (10 608)
Emergency	2.5	395 (567)	3.1	460 (803)	2.8	476 (801)
Specialist	7.7	318 (812)	10.8	293 (726)	11.4	327 (866)
Outpatient	20.6	219 (531)	24.8	223 (510)	28.4	222 (584)
Well-child visit	2.7	113 (99)	3.0	125 (112)	2.2	106 (94)

**Table 2.** Effects of New and Late Enrollment on First-Month Claims Expenditures, by the Major Category of Spending.

Expenditures	New enrollees	Late renewals	Late renewals controlling for the presence of chronic conditions
Total	-28.79***	-10.22*	-2.64
Inpatient	2.38	4.89	5.06
Emergency department	-2.06***	0.98	1.42*
Specialist	-8.07***	-3.70*	-1.37
Outpatient	-13.65***	-6.44***	-3.77*
Well-child visit	0.25***	0.88***	0.89***

Note. Each cell reports the estimated effect from a 2-part model that controls for age, age squared, gender, race, and year. The last column also controls for the presence of a chronic condition.

\*, \*\*, \*\*\* significant at the 90%, 95%, and 99% confidence intervals, respectively.

months 3 through 12) relative to immediate renewals. Overall, late renewals have claims experience that is \$10.22 lower. Again, this is driven by lower outpatient and specialist claims.

For those renewing ALL Kids enrollment, we have prior claims experience available in the data. The final column of Table 2 reports first-month expenditures estimates controlling for the presence of a chronic condition. When this variable is added, the differences in claims experience virtually disappears. Late renewals have first-month spending that is \$2.64 lower, but the result lacks statistical significance. We do find that emergency department expenditures are modestly higher (\$1.42 per child). This is our only evidence of acute care adverse selection.

We experimented with alternative definitions of the initial window for new claims extending it up to 4 months. Although the magnitudes of the results change, the general story does not.

## Discussion

Adverse selection occurs when people use their own superior knowledge of their likely use of health services to strategically obtain health insurance. One might expect that a parent with a child with a chronic condition has a greater appreciation of the immediate value of health services and has an established network of providers from whom to obtain their child's care. In the absence of insurance premiums that reflect the child's underlying health status, one might reasonably expect this parent to buy CHIP coverage or renew the policy quickly. In addition, one might expect that if a parent suspects that there is something wrong with his or her child, the person will quickly enroll the child in CHIP before seeking health care. It is also conceivable that providers will assist in enrolling children in the program before undertaking expensive treatments. All of these examples reflect adverse selection into a health plan.

This analysis is subject to some limitations. First, it is a single-state study. Thus, the results may not be generalizable to other states. Second, given the nature of claims data, by definition we did not have prior utilization data on new enrollees. As a result, we were unable to directly test the extent to which the presence of chronic conditions motivated new enrollment as it appears to have motivated immediate renewal. This might be overcome with an all payer claims database, but even then data would be missing for children newly arriving to the system. Third, we have no information on household characteristics that might better inform the decision to acquire or renew coverage.

The results of our analysis indicate that adverse selection exists within the Alabama CHIP. Controlling for other factors, children who are immediately renewed in the program have higher spending than do either new enrollees or late renewals. Immediate renewals have the total first-month spending that was nearly \$29 higher than new enrollees and more than \$10 higher than late renewals.

Moreover, the adverse selection appears to be almost entirely driven by children with chronic conditions. When we control for prior year CHIP spending on the child in comparisons between immediate and late renewals the difference in spending becomes small and statistically insignificant. Without data on the prior utilization data of new enrollees, we cannot directly extend this result to children newly enrolled in the program. However, one might expect that if there had been serious acute events, we would see higher spending on new enrollees in the categories of inpatient care and emergency department use, which we did not observe.

There are only modest barriers to the enrollment into the Alabama CHIP program. Two are perhaps paramount. First, for a family with income between 101% and 150% of the FPL, the annual premium for a single child is \$52; \$104 for those with incomes between 150% and 300% of the FPL. For a new enrollee with family income near the poverty level, this may be significant if the child has no immediate need for health care. Second, there are transactions costs associated with renewal. These time costs are not excessive; on receipt of an invoice, parents may pay by check, or with a credit or debit card online or over the phone. The inertia associated with these costs, however, is consistent with the Thaler and Sunstein (2009) “nudge hypothesis” that even small transactions costs impel people to forego generally beneficially actions.<sup>8</sup>

These results suggest that adverse selection exists in the children’s health insurance program and is driven by chronic conditions. Thus, new enrollees are likely to cost more than those enrolling later in the program life. However, their use of services is likely to be concentrated among primary care providers. Moreover, outreach efforts to attract unenrolled but eligible children are likely to disproportionately attract children who are of low cost, relative to those already enrolled.

### Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This project was funded by a contract from the Alabama Department of Public Health.

### References

1. Miller RH, Luft HS. Managed care plan performance since 1980. *JAMA*. 1994;271:1512-1519.
2. Fowles JB, Weiner JP, Knutson D. *A Comparison of Alternative Approaches to Risk Measurement* (Final Report to the Physician Payment Review Commission). Minneapolis, MN: Park Nicollet Medical Foundation; 1994.
3. Morrisey MA, Kilgore ML, Becker DJ, Smith W, Delzell E. Favorable selection, risk adjustment and the Medicare advantage program. *Health Serv Res*. 2013;48:1039-1056.
4. Cutler DM, Zeckhauser RJ. The anatomy of health insurance. In: Culyer AJ, Newhouse JP (eds) *Handbook of Health Economics*. Amsterdam, the Netherlands: Elsevier; 2000, pp. 563-644.
5. Bundorf MK, Herring B, Pauly MV. Health risk, income, and employment-based health insurance. *Forum Health Econ Policy*. 2010;13(2):13.
6. Fang H, Keane MP, Silverman D. Sources of advantageous selection: evidence from the Medigap insurance market. *J Political Econ*. 2008;116:303-350.
7. Becker DJ, Blackburn J, Kilgore MK, et al. Continuity of insurance coverage and ambulatory sensitive ED visits/hospitalizations: evidence from the children’s health insurance program. *Clin Pediatr (Phila)*. 2011;50:963-973.
8. Thaler RH, Sunstein CR. *Nudge: Improving Decisions About Health, Wealth, and Happiness*. New York, NY: Penguin Books; 2009.