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The Development of Financing and Reimbursement  
Strategies for Children with Special Health Care Needs



NATIONAL CENTER ON FINANCING FOR CHILDREN  
WITH SPECIAL HEALTH CARE NEEDS



## **The Development of Financing and Reimbursement Strategies for Children with Special Health Care Needs**

Elizabeth Shenkman, PhD  
Institute for Child Health Policy, University of Florida

Sema Aydede, PhD  
Institute for Child Health Policy, University of Florida

Andrew W. Dick, PhD  
Department of Pediatrics, University of Rochester

David Sappington, PhD  
Department of Economics, University of Florida

Bruce Vogel, PhD  
Department of Health Policy and Epidemiology, University of Florida

Lise Youngblade, PhD  
Institute for Child Health Policy, University of Florida

Donna Hope Wegener, MA  
Institute for Child Health Policy, University of Florida

Peter G. Szilagyi, MD, MPH  
Department of Pediatrics, University of Rochester

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Henry Ireys, PhD, Mathematica Policy Research, Inc. Washington, DC  
Richard Kronick, PhD, Associate Professor and Chief, Department of Family and Preventive Medicine, University of California at San Diego, La Jolla, CA  
Tom McInerney, MD, Professor and Associate Chair for Clinical Affairs, Department of Pediatrics, University of Rochester, Rochester, NY  
Rose Naff, Executive Director, Florida Healthy Kids Corporation, Tallahassee, FL  
John Nackashi, MD, Professor of Pediatrics, University of Florida  
Richard Phillips, Vice President-Underwriting Manager, American Re HealthCare, Princeton, NJ  
Nancy Ross, PhD, Agency for Health Care Administration, Tallahassee, FL  
Phyllis Sloyer, RN, MPH, PhD, Deputy Director, Children's Medical Services, Florida's Title V Program, Tallahassee, FL  
Ruth E.K. Stein, MD, Professor of Pediatrics, Albert Einstein College of Medicine, Yeshiva University, Bronx, NY  
Gary Young, Quality Improvement Manager, Medicaid/SCHIP, Texas Health and Human Services Commission, Austin, TX

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## EXECUTIVE SUMMARY

### Introduction and Purpose

In 2001, an estimated 12.8% of children in the United States had a special health care need (Blumberg, 2003). The Maternal and Child Health Bureau (MCHB) defines children with special health care needs (CSHCN) as children “who have or are at elevated risk for chronic physical, developmental, behavioral, or emotional conditions and who also require health and related services of a type or amount not usually required by children”(MCHB,1995). Because CSHCN often require more health care services than other children, their care can be particularly costly. If insurers and health care providers are not compensated adequately for these costs, they may be motivated to avoid this population to protect themselves from potentially devastating financial losses. The result can be reduced access to care for those who need it most.

Studies of appropriate strategies for financing health care and for reimbursing providers traditionally have focused on settings with adult populations (Kuhlthau and Ferris, 2003). However, an expanding focus on pediatric populations is emerging with the recognition that CSHCN are particularly vulnerable to poor outcomes when their access to health care or the quality of that care is limited. In addition, state Medicaid and Children’s Health Insurance Programs (CHIP) are struggling in the presence of rising health care costs to find payment strategies that facilitate adequate care for children with chronic conditions (Lutzky and Bovbjerg, 2003). This issue is particularly important for state programs because of the large percentages of CSHCN that they insure. Medicaid, for example, provides health insurance coverage for one-third of all CSHCN (American Academy of Pediatrics, 2003). In addition, state children’s health insurance programs (SCHIP) often enroll relatively high proportions of CSHCN (Szilagyi, Shenkman, Brach et al., 2004; Blumberg, Olson, Frankel, et al., 2003).

This technical report has three primary components. First, we describe the health status of the children enrolled in Medicaid in three states and in SCHIP in two states. (Multiple programs and states are examined to ensure more robust findings.) Second, we analyze the health care expenditures for children in these programs, and explore how expenditures vary with their health status. Third, we examine various risk assessment and reimbursement strategies that states currently use for their adult and pediatric populations for their utility with CSHCN. These strategies include demographic and health-based risk adjustment, service and condition carve-outs, and reinsurance.

The utility of different risk assessment and reimbursement strategies lies in their ability to reduce the variability in net payments to health plans. The net payment to a health plan is the difference between the payment made to the plan on behalf of enrollees and the plan’s health care expenditures on the enrollees. Reductions in the variability in net payments to health plans are valuable for at least two reasons. First, reduced variation in net payments for individual enrollees can limit a plan’s incentive to engage in risk selection (i.e., to avoid high-cost individuals and to select those with better health status) without providing incentives for over- or

under-utilization of care. Second, if the reimbursement strategies minimize the risk of suffering large, unanticipated financial losses when serving CSHCN, plans might be more inclined to participate with state insurance programs and provide needed health care services to CSHCN.

## **Methods, Data Sources, and Analytic Strategies**

**Instruments:** We used the Clinical Risk Groups (CRGs) as an indicator of a child’s likely consumption of health care services. The CRGs are a categorical clinical system that classifies individuals according to their diagnosed health status (Neff, Sharpe, Muldoon, Graham, Popalisky and Gay, 2002). The CRGs include nine core health status groups: healthy, significant acute, minor chronic, multiple minor chronic pairs, single dominant or moderate chronic, multiple significant chronic pairs, chronic triplets, catastrophic, and metastatic malignancy. We examined the incremental ability of CRGs to predict future health care expenditures relative to predictions based only on demographic (i.e., age and gender) factors. Then, assuming that the payment to a health plan for an enrollee reflects the best estimate of the plan’s future health care expenditures for that enrollee, we examined the ability of health-based risk adjustment to reduce the variability in net payments to health plans.

We also assessed the impact of different carve-out strategies in more closely aligning payments with expenditures (i.e., in reducing the variability in net payments). Carve-outs occur when health care expenditures for pre-specified services or conditions are separated (i.e., “carved out”) from other expenditures and reimbursed separately. The service carve-outs we analyzed were for skilled nursing, physical, occupational and speech therapies, and pharmacy. The condition carve-outs we analyzed were for malignancies and catastrophic conditions. These particular carve-outs were selected because of their common use in state insurance programs. The carve-outs were examined alone and in combination with health-based risk adjustment, using the CRGs.

Finally, we examined the ability of reinsurance to reduce variability in net payments to health plans. In return for an up-front payment by the health plan, reinsurance limits to a specified threshold level (or “attachment point”) the financial loss the plan can incur on its provision of health care services to an enrollee. We analyzed the impact of reinsurance on variability in net payments at attachment points of \$50,000, \$75,000, and \$100,000. Each of these levels falls within the range used by most states, excluding states that are particularly generous (Arizona at \$5,000) or particularly restrictive (Pennsylvania at \$200,000). Reinsurance was examined alone and in combination with health-based risk adjustment.

**Data Sources:** We employed information from enrollment and claims databases for children enrolled in Medicaid in three states and SCHIP in two states. The claims and encounter databases all contain person-level data that include ICD-9-CM codes assigned at the time of the health care encounters, Current Procedure Terminology (CPT) codes, revenue codes, and National Drug Codes (NDC). The databases contain inpatient, outpatient and pharmacy files for the years 1999 – 2003, depending on the program. For one state Medicaid program the databases contain encounter data from 1996-1997. The enrollment files provide the children’s age, gender, and number of months enrolled in the program.



Data for two of the states were obtained directly from the states and are housed at the University of Florida's Institute for Child Health Policy. The (Medicaid) data for the third state was obtained through a cooperative agreement with the Center for Medicare and Medicaid Services.

To calculate the expenditures for the delivered health care services, the CPT codes were linked to the Practice Management Information Incorporated (PMIC) listing of physician fees and a per diem of \$3,000 was assigned to each day of an inpatient stay. A wholesale price index was used to assign charges to the pharmacy data. These fees do not necessarily reflect the states' actual payment experiences. However, use of the index allows us to compare the performance of the reimbursement strategies across states, while holding the fees constant.

**Data Analysis:** Our assessment of the ability of common reimbursement strategies to reduce the variability in net payments to health plans proceeded in three steps. First, we calculated the net payment the plans would secure for each enrollee under the various reimbursement strategies. The payment made on an enrollee's behalf in a given year was assumed to be the predicted expenditure on the enrollee, given the enrollee's health status (e.g., CRG) in the preceding year and any other relevant characteristics of the enrollee (e.g., the enrollee's age and gender). The net payment for the enrollee was then calculated as the difference between this predicted expenditure and the plan's actual expenditure on the enrollee, after controlling for any carve-outs or reinsurance under consideration. Second, we calculated the standard deviation – a common measure of variability – of the net payments.<sup>1</sup> Third, we measured the extent to which the various reimbursement strategies under consideration reduced the variability in net payments to the health plans in our sample.

## Key Findings

- There is great consistency in the findings across the states and between the Medicaid Programs and SCHIP initiatives in our study. The similarity in findings enhances our confidence in the financing and reimbursement recommendations presented in the Discussion Section. The CPT codes were linked to a fee schedule and a per diem was assigned for inpatient stays. Therefore the dollar amounts reported do not reflect the health plans' actual paid amounts.
- In all state programs, most children are new enrollees or are classified as "healthy". Less than 20% of the children have significant acute or chronic conditions.
- Health care expenditures on SCHIP enrollees are smaller than the corresponding expenditures for Medicaid enrollees, on average. As an illustration, Average expenditures on SCHIP enrollees range between \$102 and \$126 per member per month (PMPM) in our sample. Average expenditures on Medicaid enrollees range between \$222 and \$295 PMPM.

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<sup>1</sup> The standard deviation of a sample is the square root of its variance. The variance of a sample is the sum of the squares of the differences between the sample observations and the sample means, divided by the number of observations in the sample.

- Health care expenditures are substantially higher for children in the most severe health status categories. As an illustration, expenditures on children classified as healthy range from \$57 PMPM (in SCHIP in State I) to \$114 PMPM (in Medicaid in State II). In contrast, expenditures on children with malignant and catastrophic conditions range from \$4,457 PMPM (in SCHIP in State II) to \$6,510 (in SCHIP in State I).
- Risk adjustment procedures based only on demographic factors result in slight or no average overpayments (i.e., payments in excess of expenditures) in the SCHIP populations in our study. For example, these procedures produce average underpayments (i.e., payments below expenditures) of between \$33 and \$102 PMPM for children in the Medicaid populations in our study.
- Risk adjustment procedures based only on demographic factors result in pronounced underpayments for children with diagnosed medical problems. For example, the average underpayment for children with a moderate chronic condition is \$525 PMPM in SCHIP in State I. The corresponding underpayment is \$477 PMPM in Medicaid in State III.
- Health-based risk adjustment procedures produce substantially higher payments and smaller underpayments for children diagnosed with chronic conditions. For example, when risk adjustment is based on enrollee demographic characteristics only, the payment for a child in State I in SCHIP is \$112 PMPM whether the child is healthy or has a moderate chronic condition. In contrast, when demographic and health-based risk adjustment strategies are both employed, the payment in State I in SCHIP is \$100 PMPM for a healthy child and \$612 for a child with moderate chronic conditions.
- Carve-outs alone do little to better align payments according to the children's health status or to reduce variability in net payments to health plans.
- Although health-based risk adjustment strategies more closely align payments and expenditures on average, the strategies leave considerable variability in net payments in all health status categories, particularly the categories associated with severe health conditions.
- Reinsurance reduces substantially the variability in net payments to health plans. To illustrate, the variability in net payments (i.e., their standard deviation) is approximately \$1,400 in SCHIP in State II and over \$2,500 in Medicaid in State II when demographic and health-based risk adjustment is employed (without reinsurance). Carve-outs reduce this variability only negligibly. However, the variability in net payments declines to less than \$500 for SCHIP and less than \$1,500 for Medicaid when reinsurance at the \$75,000 attachment point is employed.

## Discussion and Next Steps

Over the last several years, states have enrolled CSHCN in a variety of managed care arrangements where the children potentially face restricted access to care due to strict controls placed on health care use and expenditures (Newacheck, Stein, Walker, et al., 1996). Strategies that ensure appropriate payment to health plans and providers caring for CSHCN may increase the attraction of serving CSHCN and diminish incentives to engage in risk selection. The result can be increased access to crucial health care services for these vulnerable children, even in the face of pronounced state fiscal pressures.

State Medicaid and SCHIP initiatives also face challenges in attracting health plans and providers to participate in their programs. Ensuring a medical home and good continuity of care is contingent upon building and retaining a strong provider network. About one-half of Medicaid and SCHIP health plans report difficulties in negotiating contracts with primary care providers and specialists, particularly pediatric sub-specialists, which can further reduce access to care for CSHCN. However, the problems in contract negotiations may be mitigated if reimbursement and financing strategies afford health plans and health care providers greater protection against financial risk.

In addition, states are facing enormous fiscal pressures. Some of the states' efforts to control costs are directed toward SCHIP, where CSHCN comprise 17% or more of the enrollee pools (Szilagyi, Shenkman, Brach et al., 2004). This percentage is relatively high, given that CSHCN are believed to account for approximately 12% to 13% of the relevant populations in most states (Blumberg, Olson, Frankel, et al., 2003). Financing strategies that redistribute limited resources according to children's health status may be appealing to states as they address their fiscal constraints. By focusing on payments by states to health plans, our study lays a critical foundation for addressing financing and reimbursement strategies for a large and vulnerable group of CSHCN at a common point of entry into the health care system.

Our study examined strategies that states commonly employ to reduce the reluctance of health plans to enter the Medicaid and SCHIP markets and to reduce financial incentives to risk select based on health status. These strategies include health-based risk adjustment and condition and service carve-outs. We also examined reinsurance strategies used to protect against largely unpredictable events that require large expenditures.

As noted above, our research to date indicates that health-based risk adjustment and reinsurance together can reduce substantially the variability in net payments to health plans. Thus, these strategies offer an option to reduce risk selection and limit pronounced financial losses for health plans. Our future work will focus on health plan payments to physicians and we will examine optimal strategies to ensure physicians are fairly compensated when caring for CSHCN.

Our future work on reinsurance will analyze the optimal design of reinsurance policies, accounting explicitly for the benefits and costs of reinsurance. We will also explore the utility of reinsurance that limits a plan's aggregate losses rather than losses on individual enrollees. In addition, we will study the effects of cost-sharing above attachment points to limit excessive

health care expenditures once the attachment point has been attained. Some reinsurance policies require the use of specialized provider networks and care coordination (Lutzky and Bovbjerg, 2003). Recent experience in Maryland and Florida in this regard may serve as useful models to inform a systematic study of these policies.

Although carve-outs are common in state programs, our study suggests that they do not reduce substantially the variability in net payments to health plans. However, condition carve-outs may offer other advantages, such as allowing children to receive care within specialized networks. In principle, service carve-outs also may enhance the likelihood that CSHCN will receive specialized services such as skilled nursing or therapies. Such possibilities will be explored in future work, as will additional carve-outs (including carve-outs for behavioral health).

Future work will also address other critical issues related to health care financing and reimbursement for CSHCN. These issues include families' out-of-pocket spending, the impact of different reimbursement strategies on health plans of different sizes and with different percentages of CSHCN, and the effects of different policies that health plans employ to compensate their providers.

## INTRODUCTION

In 2001, an estimated 12.8% of children in the United States had a special health care need (Blumberg, 2003). The Maternal and Child Health Bureau (MCHB) defines children with special health care needs (CSHCN) as children “who have or are at elevated risk for chronic physical, developmental, behavioral, or emotional conditions and who also require health and related services of a type or amount not usually required by children”(MCHB,1995). Because CSHCN often require more health care services than other children, their care can be particularly costly. If insurers and health care providers are not compensated adequately for these costs, they may be motivated to avoid this population to protect themselves from potentially devastating financial losses. The result can be reduced access to care for those who need it most.

Traditionally, studies of appropriate strategies to finance health care costs and to reimburse health care providers have focused on settings with adult patients due to their high health care expenditures. Little attention has been paid to the pediatric population (Kuhlthau and Ferris, 2003). However, an expanding focus on pediatric populations is emerging with the recognition that CSHCN are particularly vulnerable to poor outcomes when their access to health care or the quality of that care is limited. In addition, state Medicaid and Children’s Health Insurance Programs (CHIP) are struggling in the presence of rising health care costs to find payment strategies that facilitate adequate care for children with chronic conditions (Lutzky and Bovbjerg, 2003). This issue is particularly important for state programs because of the large percentages of CSHCN that they insure. Medicaid provides health insurance coverage for one-third of all CSHCN (American Academy of Pediatrics, 2003) and while exact figures are not available for SCHIP, some studies indicate that the percentage is higher than expected when compared to general population estimates. For example, the prevalence of CSHCN in SCHIP in New York, Florida, and Kansas (17%, 18%, and 25%; respectively) is higher than the most recent estimates of prevalence of CSHCN in these states from the National Survey of Children with Special Health Care Needs (12%, 13% and 15%) (Szilagyi, Shenkman, Brach et al. 2004; Blumberg, Olson, Frankel, et al. 2003).

Relatively little is known either about the pattern of health care expenditures for CSHCN or about desirable policies for reimbursing health plans and providers for their care. In contrast, there are many risk assessment and reimbursement strategies used among adult populations or broadly across Medicaid and other publicly insured groups. These strategies can be analyzed to determine their utility in the pediatric population. Examining existing strategies for their applicability to CSHCN may be particularly appealing to state Medicaid Programs and CHIP, health plans, and providers, because of the relative ease of extending an existing system or systems to address children’s needs, rather than developing an entirely new approach.

Risk assessment entails forecasting a group’s future health care expenditures and/or use based on its health status in a concurrent or a prior period. These risk assessments can then be used to adjust capitated payments to health plans or to providers (Fishman, Goodman, Hornbrook, et al., 2003). Reimbursement strategies cover a wide array of payment mechanisms including capitation, fee-for-service (FFS), blended payments that combine FFS with capitation, reinsurance (payments for high cost cases that exceed a certain dollar threshold in a year), and

others. Because so many CSHCN are publicly insured, our focus is on examining risk adjustment and reimbursement strategies commonly used by state agencies to reimburse health plans. The present focus is also on reimbursement to health plans, not to providers. Ensuring adequate payments from the state to health plans is the first step in ensuring access to care for CSHCN. Additional analyses are being conducted to examine payment from health plans to providers and will be reported separately.

The purpose of this technical report is threefold. First, we describe the health status of children enrolled in Medicaid in three states and in SCHIP in two states.<sup>2</sup> Second, we analyze the annual health care expenditures for children in these programs according to their health status. Third, we examine various risk assessment and reimbursement strategies that states currently use for their adult and pediatric populations for their utility with CSHCN.

When assessing the utility of different risk assessment and reimbursement strategies, we focused on three major considerations. First, the strategies had to reduce the incentive of health plans to engage in risk selection (i.e., to avoid high-cost individuals and to select those with better health status). Strategies that mitigate risks at the time of enrollment by addressing costs associated with high risk cases are often called “ex ante” approaches. Such strategies attempt to align health care payments and expenditures more closely without providing incentives for over-utilization of care. The ex ante approaches considered in this report include health-based risk adjustment strategies and service and disease carve-outs.

Second, the strategies had to reduce variability in net payments (i.e., the difference between payments and health care expenditures) to the health plans. “Ex post” approaches, or those approaches intended to mitigate the risk associated with unanticipated high spending or to adjust the risk associated with a particular group (i.e., pregnant women), after the expenditures are incurred, are often used to reduce variability in net payments. We considered the ability of reinsurance at various attachment points to match *ex post* payments to expenditures.

Third, the strategies had to offer improvements over the commonly used age, gender, and geographic adjustments found in most Medicaid Programs and SCHIP initiatives. Several states and programs were selected for analysis so that we could determine if similar findings regarding the utility of the various reimbursement strategies would prevail across different settings.

## **BACKGROUND**

Most states use age, gender, and geographic adjustments to adjust capitated payments to the health plans that participate in their Medicaid Programs and SCHIP initiatives. However, alternative adjustments are used, including health-based risk adjusted payments, carve-outs, and reinsurance. In this section, we describe the most common health-based risk adjustment

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<sup>2</sup> States agreed to share data with us on the condition that their identities are not revealed in the report. Because we only have data for one Title V CSHCN Program and because this program is unique in terms of the active referral of CSHCN into the program and the array of services provided in specialized networks, the results from this program will be forthcoming in a separate volume.

strategies.<sup>3</sup> We also describe less common, but potentially promising, strategies for structuring health care payments for CSHCN.

### ***Health-Based Risk Assessment Approaches***

Most risk assessment methods rely on state and health plan administrative databases, which contain information about diagnoses assigned to enrollees at the time of their health care visits. In principle, this diagnostic information can be used to adjust capitated payments. Several systems relying on International Classification of Disease, 9<sup>th</sup> Revision, Clinical Modification (ICD-9-CM) are available and are used in some state programs (American Medical Association, 2002). These systems include the Clinical Risk Groups (CRGs), the Ambulatory Clinical Groups (ACGs), the Chronic Disability Payment System (CDPS), and the Hierarchical Coexisting Conditions (HCCs). Each of these systems has a different conceptual framework to determine how the diagnoses are grouped and which diagnoses are included for consideration in predicting future health care resource consumption. However, all of these systems rely on ICD-9 codes found in health care claims and encounter databases. Descriptions of several of these systems, their conceptual frameworks, intended uses, advantages and disadvantages, and references are available in a comprehensive matrix (Shenkman and Breiner, 2001).

Health-based risk adjustment systems show substantially improved performance over the standard age, gender, and geographic adjustments in predicting health care expenditure and high-cost users (Fowler and Anderson, 1996; Weiner, Dobson, and Maxwell, et al., 1996; Gay, Muldoon, Neff, and Wing, 1997; Gilmer, Dreyfus, and Lee, 2000; Adams, Bronstein, Raskind-Hood, 2002; Meenan, Goodman, Fishman, et al., 2003). In two studies of Medicaid and SCHIP payment strategies, six of thirty-six reporting states risk-adjusted their payments using health-status based systems (either the CDPS or the ACGs) (Holahan and Suzuki, 2003; Holahan, 2003).

There are limitations to health-based risk adjustment systems, including concerns about the quality of administrative data and the fact that claims and encounter databases are designed for billing purposes and lack clinical information that would be useful for predicting expenditures. The quality of administrative databases has improved greatly over time (Hornbrook, Goodman, Fishman et al., 1998). However, incorporating more detailed clinical information in health-based risk assessment approaches presents ongoing challenges.

There are some limited theoretical and practical examples where insurers or providers use detailed clinical information to place enrollees or patients in high-risk pools thereby minimizing their financial risks (Sappington and Lewis, 1999; Nigel and Smith, 2001). Dudley and his colleagues have developed and tested a model that combines the use of health-based risk adjustment approaches with more detailed clinical information, but only for certain pre-determined, expensive conditions (Dudley, Medlin, Hammann, et al., 2003). This model improves the match between payments and expenditures, but it has not been applied to children.

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<sup>3</sup> The primary strategies that states use were identified using documentation provided by the National Academy of State Health Policy (Kaye, 2001).

Furthermore, it is not certain if the benefits of the additional data collection and auditing outweigh the associated costs.

Health services researchers and economists also have tried to combine functional status information with diagnoses to further refine payment predictions. Some studies have demonstrated improved predictions with the addition of functional status information for certain diagnoses (Hornbrook and Goodman, 1996). However, surveys are costly to administer and may be susceptible to the practice of “gaming” whereby respondents provide responses that are believed to be associated with higher payments.

### ***Carve-Outs***

Carve-outs refer to the exclusion of certain conditions, populations, and/or services when calculating capitation rates. Separate payments for individuals with high-cost conditions or those with likely intensive use of high-cost services such as pharmacy are thought to reduce the incentive of health plans to avoid such enrollees (Manning, Newhouse, Duan et al, 1987). Most carve-outs use providers, management entities, and financial incentives that differ from those otherwise available within the health plan. Behavioral health carve-outs are perhaps the best known, and share with other types of carve-outs the goal of better coordinating care for enrollees while providing cost savings (Lambert, Hartley, Bird, Ralph, Saucier, 1998).

Several studies examining behavioral carve-outs have found them to produce substantial cost savings (Callahan, Shepard, Beinecke, et al, 1995; Frank and McGuire, 1997; Huskamp, 1998). Most of these studies, however, are based on pre-post analyses without compelling control or comparison groups. Thus, the prior findings of savings may be due in part to factors other than the behavioral carve-outs. Other carefully designed analyses have found no differences in expenditures for carve-outs compared to non-carve-out programs (Coffey, 2002).

### ***Care Coordination Programs and Pooling of High-Cost Enrollees***

Although the practice is not typical, some states enroll CSHCN in special care management programs that use provider networks separate from the managed care plan. The incentives of health plans to risk select can be reduced by such practices because very high-cost enrollees are removed from the plans and placed into different systems of care. Maryland offers such a (voluntary) program for children with chronic, severe health conditions (Lutzky and Bovbjerg, 2003). Florida screens all Medicaid and SCHIP applicants for the presence of special needs and enrolls those meeting medical eligibility criteria into its State Title V CSHCN Program known as Children’s Medical Services (CMS). Once children are in CMS, they receive care as part of a separate network dedicated to caring for CSHCN, and their care is reimbursed through either Medicaid fee-for-service or enhanced capitation arrangements.

### ***Reinsurance***

“Reinsurance is an insurance mechanism through which a primary risk bearer – like a managed care organization – limits its potential losses for some or all of its enrollees” (Lutzky and Bovbjerg, 2003). Many states require health plans to purchase private or public reinsurance



offered through the state (Kaye, 2001). The basic mechanisms for reinsurance are similar. The health plan can transfer the financial risk of an enrollee to the reinsuring entity after annual expenditures for the enrollee attain a specified threshold, often called an attachment point. This threshold can vary from as little as \$5,000 per enrollee per year (in Arizona) to as much as \$200,000 per enrollee per year (in Pennsylvania). Typically, health plans continue to share some financial obligation with the reinsuring entity and remain responsible for 15% to 25% of costs above the attachment point, although the cost-sharing can be even more pronounced (Kaye, 2001). Many re-insurers also impose annual and life-time limits. Reinsurance is typically used with other strategies such as health-based risk adjustments and carve-outs.

The focus in our report is on reinsurance for individual enrollees who reach certain thresholds or attachment points for cumulative expenditures in a year. This is the most typical model. However, some reinsurance policies define the expenses considered for reinsurance purposes more narrowly (e.g., only inpatient expenses). Other policies limit the aggregate financial loss a health plan can suffer, rather than the corresponding loss on individual enrollees.

### ***Other Approaches***

There are other reimbursement strategies that we do not consider for this report. For example, prior health care expenditures can be a useful predictor of future expenditures. We chose not to include this strategy because of the undesirable incentive this approach can create for health plans and providers to deliver excessive care (Martin, Rogal, Arnold, 2004). Future reports will include some prior expenditure models to serve as a basis of comparison for health-based risk adjustment and other health care financing strategies. In addition, some states use prior expenditure models in the short-term prior to implementing health-based risk adjustment. Therefore, information about the performance of prior expenditure models may be useful to state programs even if these models are not optimal for long-term use.

This report also does not consider adjustments based on program categories. For example, states often use prior expenditures within certain Medicaid program groups such as Temporary Aid to Needy Families (TANF) or Supplemental Security Income (SSI) because the health status of individuals in those eligibility categories markedly differs. Our current analyses incorporate all Medicaid enrollees and do not separate them into different groups based on program eligibility categories. However, we will distinguish these groups in future work using prior expenditure models.

## **METHODS**

### ***Risk Assessment and Reimbursement Strategies Used***

The Clinical Risk Groups (CRGs) was used to categorize enrollees into groups based on their anticipated resource consumption. The CRGs are a categorical clinical system that classifies individuals into mutually exclusive categories (Neff, Sharpe, Muldoon, Graham, Popalisky and Gay, 2002). The CRG software reads all ICD-9-CM diagnosis codes from all health care encounters, except those associated with providers known to frequently report

unreliable codes (e.g., non-clinician providers and ancillary testing providers). It assigns all diagnosis codes to a diagnostic category (acute or chronic) and body system, and assigns all procedure codes to a procedure category. Each individual is assigned to a hierarchically defined core health status group, and then to a CRG category and severity level, if chronically ill.

The CRG definition of a chronic health condition contains three components: (a) physical, mental, emotional, behavioral or developmental disorder; (b) expected to last at least 12 months or longer or having sequelae that last at least 12 months or longer; and (c) requires ongoing treatment and/or monitoring. The CRG definition of a significant acute condition is a serious acute illness that places the individual at risk in the future for needing services of an amount and type greater than that for not chronically ill persons, and possibly at risk for an ongoing chronic health condition. In the CRG logic, an acute illness is only classified as a significant acute if it occurred in the most recent six months of the base year time period. Chronic and acute illnesses are generally classified only if there has been at least two outpatient encounters for that diagnosis separated by at least a day. There are a few diagnoses that require only one outpatient encounter based diagnosis, and these include the codes for mental retardation, Down's Syndrome, blindness, and procedural codes such as chemotherapy and renal dialysis.

There are nine core health status groups: (1) healthy (including non-users), (2) significant acute, (3) minor chronic, (4) multiple minor chronic pairs, (5) single dominant or moderate chronic, (6) multiple significant chronic pairs, (7) chronic triplets, (8) catastrophic, and (9) metastatic malignancy. Children identified as being in one of the last seven groups are considered to be CSHCN. These health status groups and examples of the conditions or illnesses included in each are listed below:

- Significant Acute Conditions are those acute illnesses that could be precursors to or place the person at risk for developing a chronic disease. Examples in this group are head injury with coma, prematurity, and meningitis.
- Minor Chronic Conditions are those illnesses that can usually be managed effectively throughout an individual's life with typically few complications and limited effect upon the individual's ability, death and future need for medical care. This category includes attention deficit / hyperactive disorders (ADHD), minor eye problems (excluding near-sightedness and other refractory disorders), hearing loss, migraine headache, some dermatological conditions, and depression.
- Moderate Chronic Conditions are those illnesses that are variable in their severity and progression, but can be complicated and require extensive care and sometimes contribute to debility and death. This category includes asthma, epilepsy, and major depressive disorders.
- Dominant Chronic Conditions are those illnesses that are serious, and often result in progressive deterioration, debility, death, and the need for more extensive medical care. Examples in this group include diabetes, sickle cell anemia, chronic obstructive lung disease and schizophrenia.
- Chronic Pairs and Triplets are those individuals who have multiple primary chronic illnesses in two (Pairs), or three or more body systems (Triplets).

- Metastatic Malignancies include acute leukemia under active treatment and other active malignant conditions that affect children.
- Catastrophic Conditions are those illnesses that are severe, often progressive, and are either associated with long term dependence on medical technology, or are life defining conditions that dominate the medical care required. Examples in this group include cystic fibrosis, spina bifida, muscular dystrophy, respirator dependent pulmonary disease and end stage renal disease on dialysis.

The CRGs were used to predict future health care expenditures of enrollees in the state programs in our study. We selected the CRGs because its definition of chronic conditions is closely aligned with the MCHB definition and because of the ease of presenting the information with nine clearly defined categories. However, any of the other systems (i.e., the CDPS, the ACGs and so on) could have been used. For the analyses presented in this report, we combined the CRG health status groups for CSHCN to reflect minor, moderate, and malignant and catastrophic health conditions. The analyses with the CRGs are intended to illustrate the type of performance that one might expect from health-based risk adjustment systems more generally. The CRG predictions were compared to predictions based solely on basic demographic factors such as age and gender. Adjustments to capitated payments based on CRGs also were used in combination with other reimbursement strategies.

We also assessed the impact of different carve-out strategies in more closely aligning payments with expenditures (i.e., in reducing the variability in net payments). The service carve-outs we analyzed were for skilled nursing, physical, occupational and speech therapies, and pharmacy. The disease carve-outs we analyzed were for malignancies and catastrophic conditions. These particular carve-outs were selected because of their common use in state insurance programs. The carve-outs were examined alone and in combination with health-based risk adjustment, including CRGs.

Finally, we examined the ability of reinsurance to reduce variability in net payments to health plans. We analyzed the impact on variability in net payments of reinsurance at attachment points of \$50,000, \$75,000, and \$100,000. Each of these levels falls within the range used by most states, excluding states that are particularly generous (Arizona at \$5,000) or particularly restrictive (Pennsylvania at \$200,000). Reinsurance was examined alone and in combination with health-based risk adjustment.

### ***Data Sources***

In this study, information from enrollment and claims databases for children enrolled in Medicaid and SCHIP in three states was used to examine different reimbursement strategies. Each state has been assigned a number to preserve anonymity. The Medicaid Program in State II is a Medicaid managed care option. The two other Medicaid Programs are Primary Care Case Management (PCCM) Programs. The claims and encounter databases all contained person-level data that included ICD-9-CM codes assigned at the time of the health care encounters, Current Procedure Terminology (CPT) codes, revenue codes, and National Drug Codes (NDC). The databases contained inpatient, outpatient and pharmacy files for the years 1999-2003, depending

on the program. For one state Medicaid program the database contains data from 1996-1997. The enrollment files contained information about the children's age, gender, and number of months enrolled in the program.

Data for two of the states (Title XIX, and the two SCHIP initiatives) were obtained directly from the states and are housed at the Institute for Child Health Policy. The dataset for the third Medicaid state was obtained through an interagency agreement with the Center for Medicare and Medicaid Services. These data are also known as State Medicaid Research Files or SMRF.

Each dataset was examined using Center for Medicare and Medicaid Services, Department of Health and Human Services (DHHS) *Final Protocol for Validating Encounter Data*. This protocol requires examination of all data fields for missing and invalid data and sets criteria for acceptable performance. In addition, the protocol recommends calculating health care use rates and assessing their reasonableness for the given population. In 95% of the cases or higher, the fields were populated with valid numbers. Moreover, an actuary reviewed the health care use rates and concurred with our opinion that the use rates seemed reasonable for the Medicaid and SCHIP populations.

The protocol also recommends medical record reviews to assess the congruence between the medical record and the encounter data. Medical record reviews were performed in two of the states and revealed approximately a 10% underreporting of encounters in the encounter data relative to the medical record. Medical record reviews could not be conducted in the third state because SMRF data were used for that state. No identifying information is provided with the SMRF data, rendering it impossible to conduct medical record reviews.

To calculate the expenditures for the delivered health care services, the CPT codes were linked to the Practice Management Information Incorporated (PMIC) listing of physician fees and a per diem of \$3,000 was assigned to each day of an inpatient stay. A wholesale price index was used to assign charges to the pharmacy data. These fees do not necessarily reflect the states' actual payment experiences. However, use of the index allows us to compare the performance of the reimbursement strategies across states, while holding the fees constant.

### ***Sample Selection***

We restricted our sample to children ages 0 to 19 years who were continuously enrolled in a program for at least 3 months for infants and for at least 6 months for those one-year of age and older during a 12 month time horizon. The continuous enrollment requirement helped to ensure the stability of our results. The age range of our sample - 0 to 19 years of age - was determined by the target age of some of the programs considered for this study.

Table 1 contains a summary of the numbers of children included in the analyses in each state and program, their age, gender, and average months of program enrollment. Table 1 also describes the time horizon used to develop the risk profiles and the time horizon used to assess expenditures based on prior risk.

**Table 1: Selected Characteristics of Children Enrolled in SCHIP (Title XXI) and Medicaid (Title XIX) Programs and Time Horizons Studied**

	STATE I		STATE II		STATE III
	SCHIP Title XXI		Medicaid Title XIX	SCHIP Title XXI	Medicaid Title XIX
<b>N</b>	168,708		337,824	496,276	262,201
<b>Mean (SD) Age</b>	11.68 (3.67)		6.01 (5.07)	9.36 (4.84)	6.55 (5.06)
<b>Gender</b>					
<b>% Female</b>	49.25		49.62	48.57	49.57
<b>% Male</b>	50.75		50.38	51.43	50.43
<b>Mean (SD) Months Enrolled</b>	10.63 (2.05)		9.74 (2.60)	10.23 (2.04)	10.49 (2.28)
<b>Time Horizon Studied</b>	June 2000-May 2001		September 2002-August 2003	June 2001-May 2002	January-December 1997
<b>Time Horizon Used For Risk Assessment</b>	June 1999-May 2000		September 2001-August 2002	June 2000-May 2001	January-December 1996
<b>Source</b>	Directly from State		Directly from State	Directly from State	SMRF data from Center for Medicare and Medicaid Services

## *Data Analysis and Assessment of Expenditure Variation*

General Approach: We focused primarily on the ability of common reimbursement strategies to align the payments plans receive with the health care expenditures they incur. When payments and expenditures are closely aligned, plan profits are relatively predictable. Furthermore, plans will not incur large financial losses on enrollees with exceptionally pronounced need for medical services. Therefore, reimbursement strategies that closely align payments and expenditures can reduce the financial risk that plans face when they provide health care services to CSHCN. Such strategies also can limit the incentives of the plans to engage in favorable selection.

Our assessment of the ability of common reimbursement strategies to reduce the variability in net payments to health plans proceeded in three steps. First, we calculated the net payment the plans would secure for each enrollee under the various reimbursement strategies. The payment made on an enrollee's behalf in a given year was assumed to be the predicted expenditure on the enrollee, given the enrollee's health status (e.g., CRG) in the preceding year and any other relevant characteristics of the enrollee (e.g., the enrollee's age and gender). The net payment for the enrollee was then calculated as the difference between this predicted expenditure and the plan's actual expenditure on the enrollee, after controlling for any carve-outs or reinsurance under consideration. Second, we calculated the standard deviation – a common measure of variability – of the net payments.<sup>4</sup> Third, we measured the extent to which the various reimbursement strategies under consideration reduced the variability in net payments to the health plans in our sample.

Management of the Skewed Distribution: Health care expenditures have several well-known properties that complicate empirical analysis. One of these properties is the significant concentration of outcomes at zero due to nonusers of the health care system. For users, on the other hand, the distribution of outcomes is highly skewed with a long right tail. These characteristics need to be taken into consideration in the formulation of statistical models in order to achieve reliable results (Duan, Manning, Morris et al., 1982; Manning, Newhouse, Duan et al., 1987)

Concentration at zero and skewness of health care expenditures characterize the pediatric populations included in this study. Graphs A-1 and A-2 in Appendix A, Volume II show the distribution of PMPM charges for one of the SCHIP populations and one of the Medicaid populations. For all groups, there is a high concentration of charges at or close to zero. For example, among the SCHIP population, 17.44% of the children were non-users and, therefore, had not incurred any charges during the January to December 2002 time period. Further, most of the children who used the health care system incurred relatively low PMPM charges. For this SCHIP population, median PMPM charges were \$39.59. It is also apparent from the long right

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<sup>4</sup> The standard deviation of a sample is the square root of its variance. The variance of a sample is the sum of the squares of the differences between the sample observations and the sample mean, divided by the number of observations in the sample. If payments matched expenditures exactly for all enrollees, net payments would always be zero, and so the variability (i.e., the standard deviation) of the net payments would be zero. More realistically, payments differ from expenditures for most or all enrollees, and the standard deviation of net payments is strictly positive. A higher standard deviation reflects greater variability.

tail of the distribution in Graph 1, that some children incurred very high PMPM charges during the time period. As a result, average charges per month were distinctly different from the median charges for the Title XXI population in State II. Specifically, average charges (\$120.80) are approximately three times the median charges during the study period. Similar results were obtained for the other SCHIP and Medicaid Programs.

To account for high concentration of observations at zero for the sample as a whole and for positively skewed health care expenditures for the sub-sample of users, we relied on the two-part model developed by researchers for the RAND Health Insurance Experiment (see for example Duan, Manning, Morris et al., 1982). In this model, the examination of health care expenditures proceeds in two stages. In the first stage, the probability that a child has incurred any health care expenditure in a given time period is analyzed. One way to specify this probability is to assume that the underlying dependent variable has a logistic distribution. In this study, logistic specification was employed to account for the concentration of observations at zero.

In the second stage, the two-part model focuses on the level of health care expenditures for those children who are users of the health care system. We followed an ordinary least squares (OLS)-based log-linear specification in the second part of the two-part model. The use of logarithmic transformations in the second stage reflects the skewness inherent in health care expenditures. In the retransformation of the log scale results to the original scale of health care expenditures, we employed the nonparametric method developed by Duan.<sup>5</sup> In this method, the smearing estimator relies on the average of the exponentiated residuals and provides a consistent estimate of exponentiated error term in the presence of homoscedasticity. As the literature (Manning, 1997; Mullahy, 1998) emphasizes, heteroscedasticity is a common problem in analyses of this sort. Datasets used in this study presented a heteroscedastic retransformation problem. To address this problem, we employed smearing coefficients derived at the CRG health status level to partially offset the impact of heteroscedasticity on the estimated response.

Management of Number of Months Enrolled, New Enrollees, and Incentives for Preventive Care and Care Coordination: As previously noted, when using the health-based risk adjustment, we allow capitated payments to vary with the health status of the enrolled children as measured by the CRG categories. To reflect the prospective nature of reimbursement strategies, we relied on claims and encounter data from a baseline period to determine the CRG health status classification. One complication is that no such data are available for children who are newly enrolled in the upcoming period. Information on charges for new enrollees from the previous period was used to impute an age-specific health care charge for the new enrollees in the upcoming period.

To provide an incentive for the provision of preventive health care and to address at least some of the costs associated with care coordination for CSHCN, additions were made to the capitated rates estimated from these models. A provision for preventive health care was incorporated based on the age-specific preventive health care charges incurred during the previous year. Provisions for care coordination were based on actual PMPM payments that

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<sup>5</sup> Duan 1983 provides an explanation of the nonparametric transformation used in the Rand Experiment.

primary care physicians working in Medicaid Primary Care Case Management (PCCM) settings receive in some states. The PCCM component is \$3.00 PMPM for care coordination. Table 2 presents the preventive care charges which were incorporated into the analyses. The financial incentives we included are modest and it is unlikely that these incentives would encourage overuse of the involved services.



**Table 2: Preventive Care Charges for Title XXI and Title XIX by Age Groups**

	PREVENTIVE CARE CHARGES (PMPM \$)				
Age Groups	STATE I		STATE II		STATE III
	SCHIP Title XXI		Medicaid Title XIX	SCHIP Title XXI	Medicaid Title XIX
Less than 1 Year Old	NA		40.01	81.07	33.72
1≤Age<5	NA		14.40	13.33	6.72
5≤Age<14	16.67		3.58	3.36	2.83
14 and above	10.05		3.41	2.14	1.92

Note: Preventive care charges for each program are based on information in claims and encounter data on preventive services in the year prior (June 1999-May 2000 for the State I SCHIP program, September 2001-August 2002 for State II Medicaid, June 2002-May 2001 for State II SCHIP, and January-December 1996 for State III Medicaid) to the study time horizon.

## RESULTS

### *Sample Characteristics*

Graph 1 shows the distribution of enrollees by CRG category for each of the programs. Graph 2 depicts the actual PMPM expenditures for each of the CRG categories for the two Medicaid Programs and the two SCHIP initiatives.

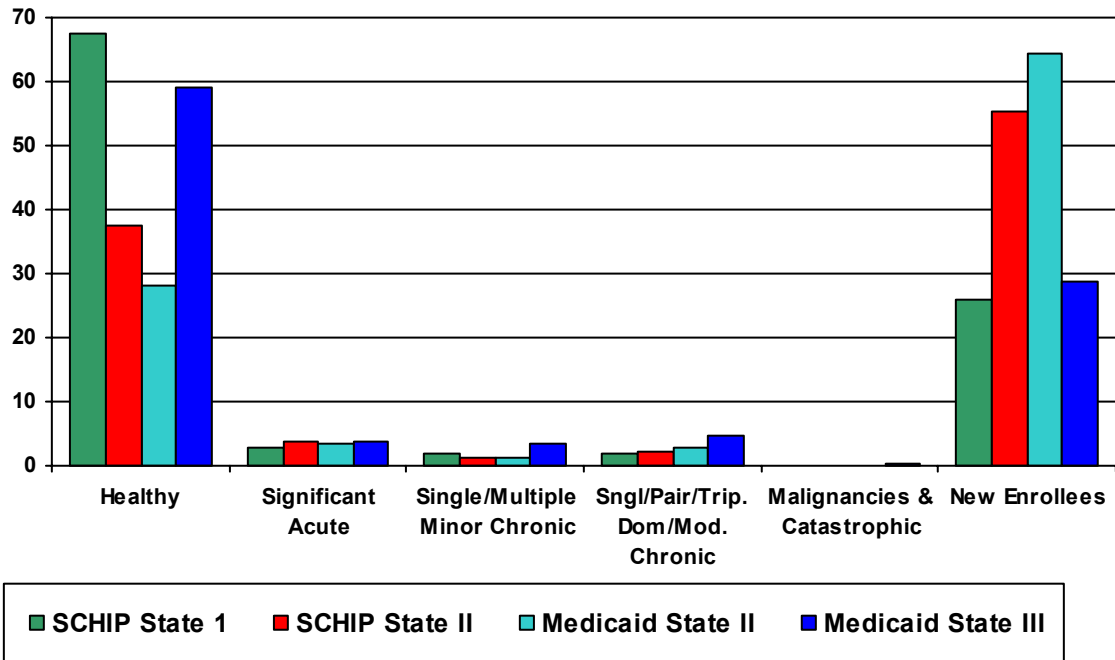
The majority of the enrollees fall into one of two categories: new enrollees or healthy (Graph 1). This finding is not surprising given that most children are healthy and that Medicaid and SCHIP initiatives often experience high enrollee turnover. There is significant variability between the states in the percentages of New Enrollees. However, the percentages of children classified as having significant acute or chronic conditions is similar across the four programs.

Overall, the PMPM expenditures for the children vary by state and by program (Graph 2). The lowest overall PMPM expenditures are seen among the SCHIP enrollees at \$102 PMPM and \$126 PMPM, depending on the state. The Medicaid enrollees are more costly at \$295 PMPM and \$222 PMPM for State II and State III, respectively. As expected, health care expenditures increase dramatically for children in the most severe health status categories. For example, children classified as healthy have PMPM expenditures that range from a low of \$57 PMPM in SCHIP in State I to a high of \$114 PMPM in Medicaid in State II. In contrast, children with malignant and catastrophic conditions have a low of \$4,457 PMPM in SCHIP in State II to a high of \$6,510 in SCHIP in State I. Based on these findings, health plans caring for a disproportionate percentage of children in the chronic condition categories would clearly be at financial risk if no adjustments were made to the PMPM premium received for each child.

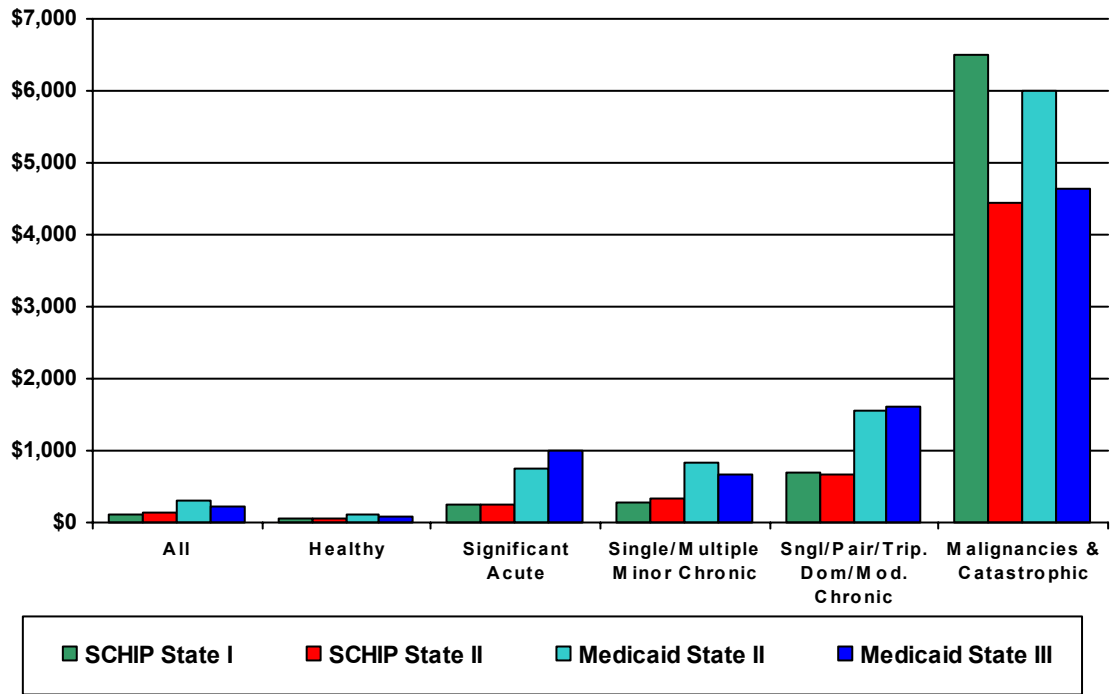
### *Key Points: Sample Characteristics*

- Regardless of the state program, most children are healthy or new enrollees.
- Although the PMPM expenditures vary by state and by program, the pattern of expenditures is the same, regardless of the program. That is, increasing PMPM expenditures are seen as the health status categories increase in severity.

**Graph 1. Distribution of Enrollees by Clinical Risk Group (CRG) Health Status Category.**



**Graph 2. Average PMPM Charges by Clinical Risk Group (CRG) Categories.**



### ***Health-Based Risk Adjustment for SCHIP and Medicaid: Payment Alignment to Health Status Categories***

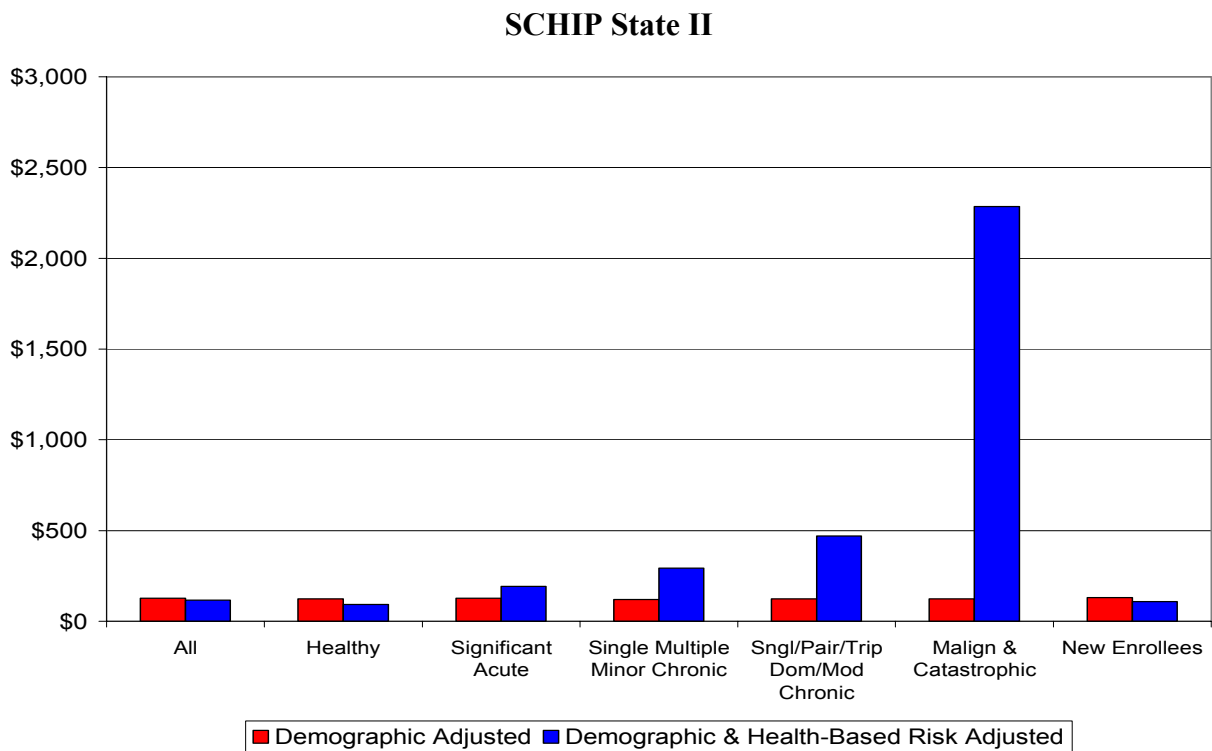
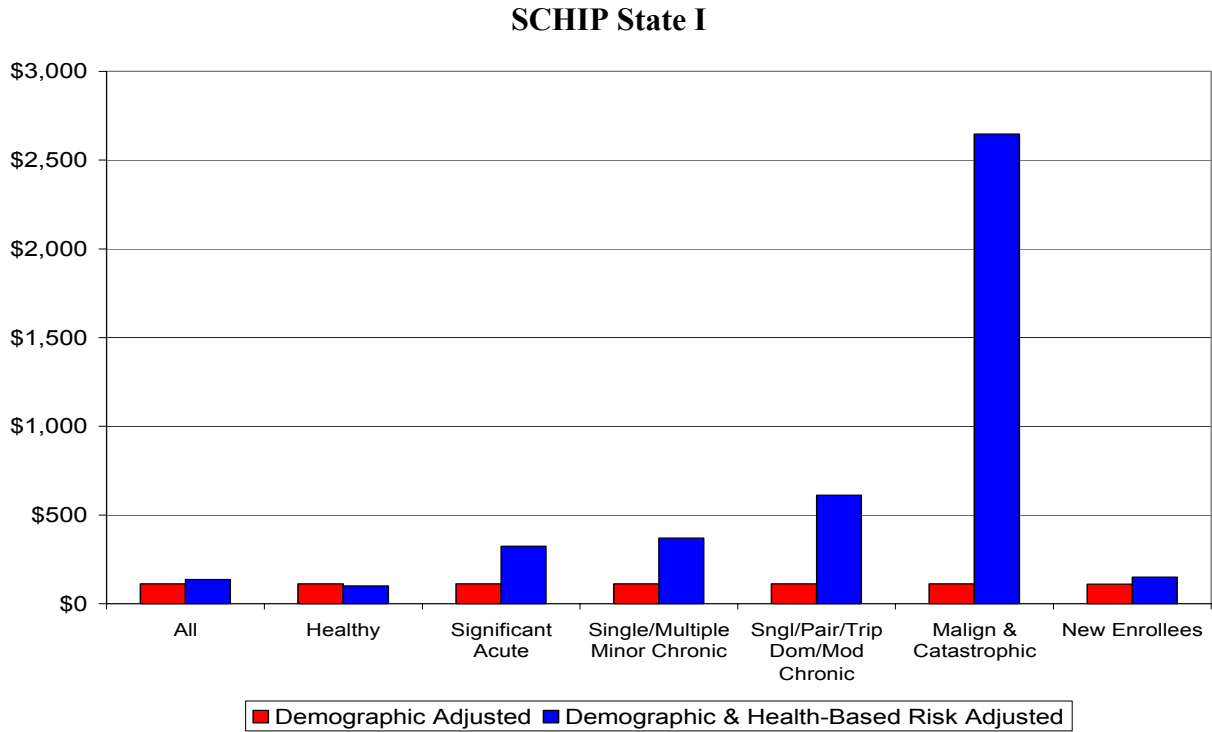
Graphs 3 and 4 show the predicted PMPM health care expenditures for the Medicaid Programs and for the SCHIP initiatives using demographic risk adjustors only in comparison to demographic and health-based risk adjustment. Although the individual PMPM amounts differ for the four populations, the distribution of payments to the different health status categories using the two different approaches is identical.

Specifically, when relying on demographic risk adjustors only, the PMPM amount paid is the same, regardless of the child's health status category. In contrast, the demographic and health-based risk adjustment approach redistributes the amount paid PMPM so that higher payments are made for children in poorer health. For example, when risk adjustment is based on enrollee demographic characteristics only, the PMPM payment for a healthy child in State I in SCHIP is \$112 and is also \$112 for a child with moderate chronic conditions. However, when demographic and health-based risk adjustment strategies are used, the PMPM payment for a healthy child in State I in SCHIP is \$100 and is \$612 for a child with moderate chronic conditions. As previously noted, although the specific PMPM amounts differ by state and by program, the pattern is the same for all four programs: demographic and health-based risk adjustment strategies used in combination more closely align PMPM payments to the enrollees' health status.

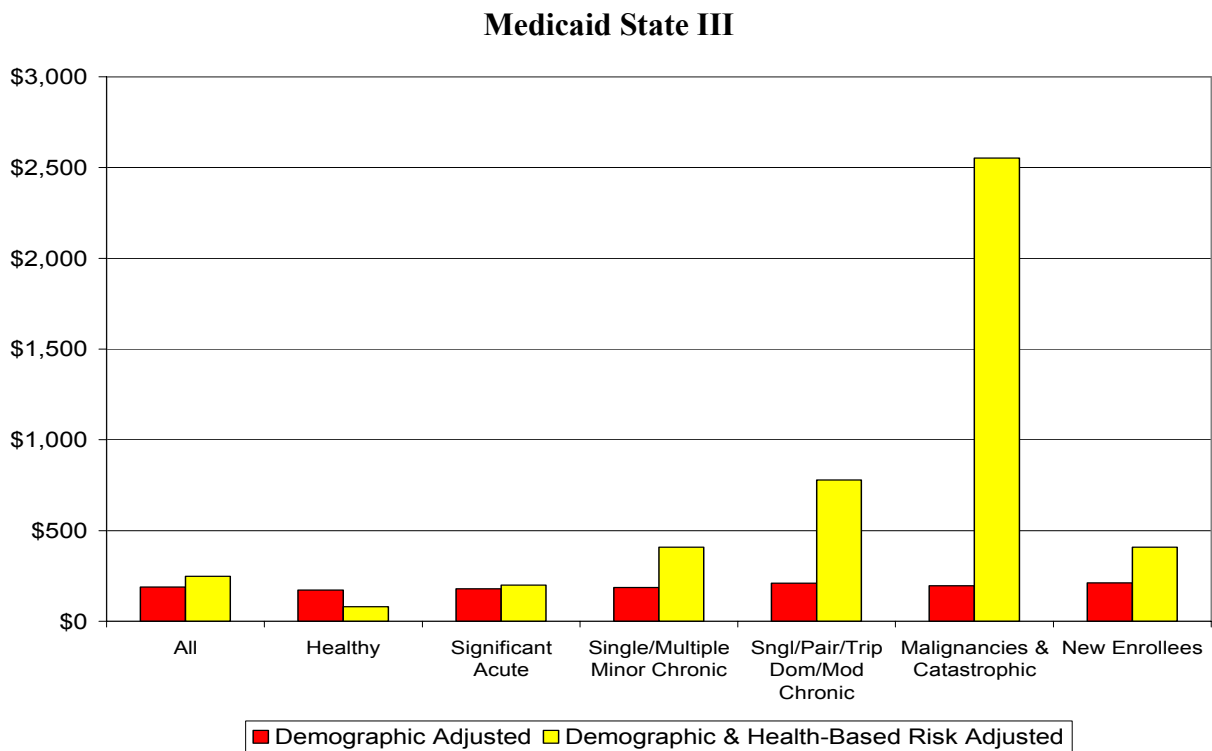
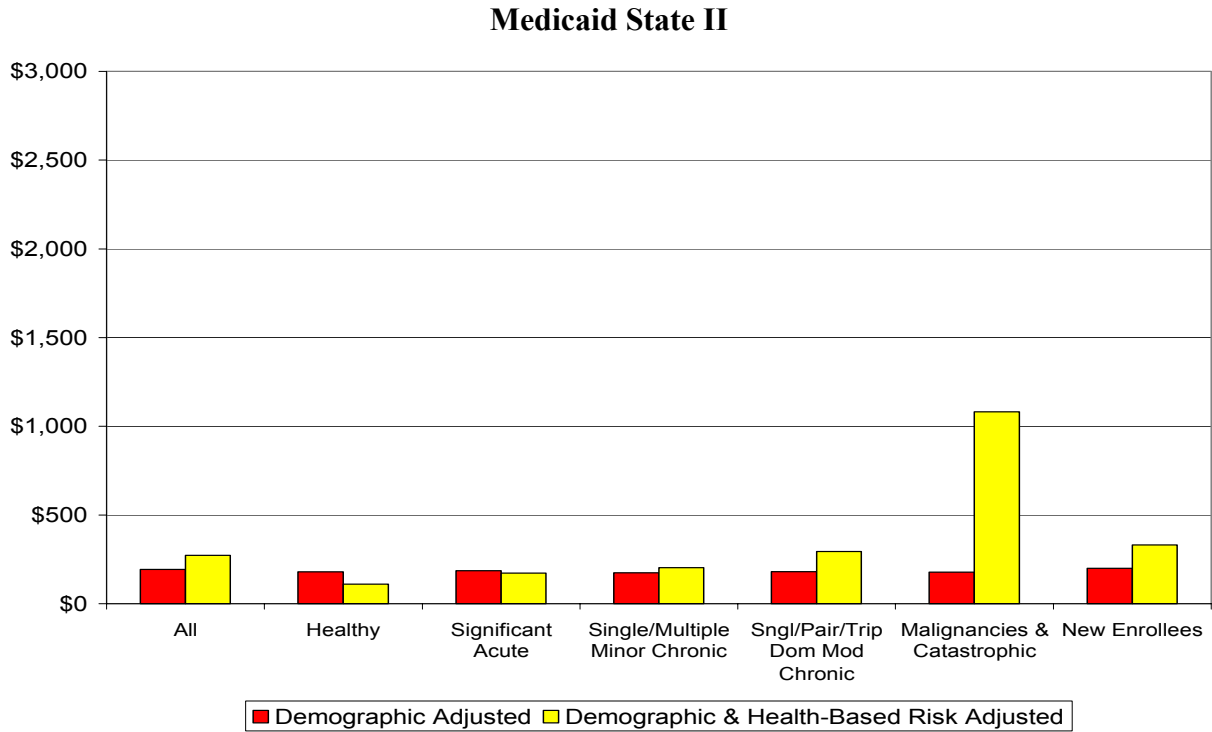
#### ***Key Points: Health-Based Risk Adjustment***

- Commonly used demographic-based risk adjustment strategies provide the same PMPM payments per enrollee, regardless of the enrollee's health status.
- Demographic and health-based risk adjustment strategies when used in combination more closely align the PMPM payments to the enrollees' health status.

**Graph 3. SCHIP States I & II—Distribution of Capitated PMPM Payments by Risk Group and for New Enrollees Using Demographic and Health-Based Risk Adjustment Compared to Demographic Risk Adjustment.**



**Graph 4. Medicaid States II & III—Distribution of Capitated PMPM Payments by Risk Group and for New Enrollees Using Demographic Health-Based Risk Adjustment Compared to Demographic Risk Adjustment.**



## ***Overpayments and Underpayments for Enrollees in SCHIP and Medicaid by Health Status Categories: Demographic-Based Versus Health-Based Risk Adjustment***

Failure to adjust capitated payments to reflect an enrollee's health status can produce substantial overpayments or underpayments for children in different health status categories. Such overpayments and underpayments can produce strong incentives for risk selection. To assess the ability of health-based risk adjusting to reduce variability in net payments to health plans, we compared the variability in net payment under two risk adjustment policies: (1) a policy that adjusts capitated payments only to reflect differences in health care expenditures associated with differences in common demographic characteristics; and (2) a policy that adjusts capitated payments to reflect differences in health care expenditures associated both with differences in common demographic characteristics and with differences in CRG health status. Graph 5 illustrates these findings for SCHIP and Graph 6 represents the Medicaid Program findings.

The graphs reveal that, on average, capitated payments based on demographic factors alone result in no overpayment to a slight overpayment in the SCHIP populations in our study. Such risk adjusting of capitated payments produces an average underpayment (payment below expenditure) of between \$33 to \$102 PMPM for the Medicaid population in our study.

Particularly in SCHIP, the underpayments may not be problematic for plans that enroll a large percentage of healthy children. However, as the children's health status worsens, the underpayments associated with demographic-based risk adjusting become more pronounced. For example, using demographic-based risk adjusters only, there is an underpayment of \$525 PMPM for children in the moderate chronic condition category in SCHIP in State I. The corresponding underpayment is \$477 for children in that category in Medicaid in State III.

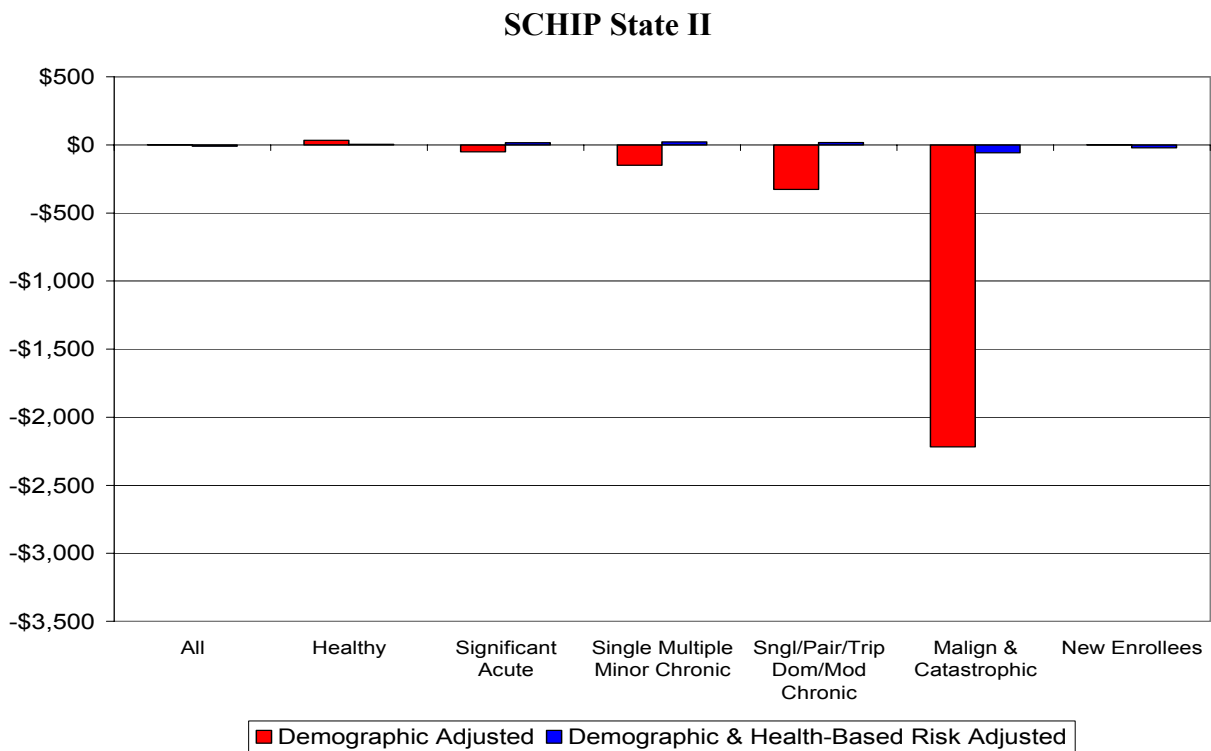
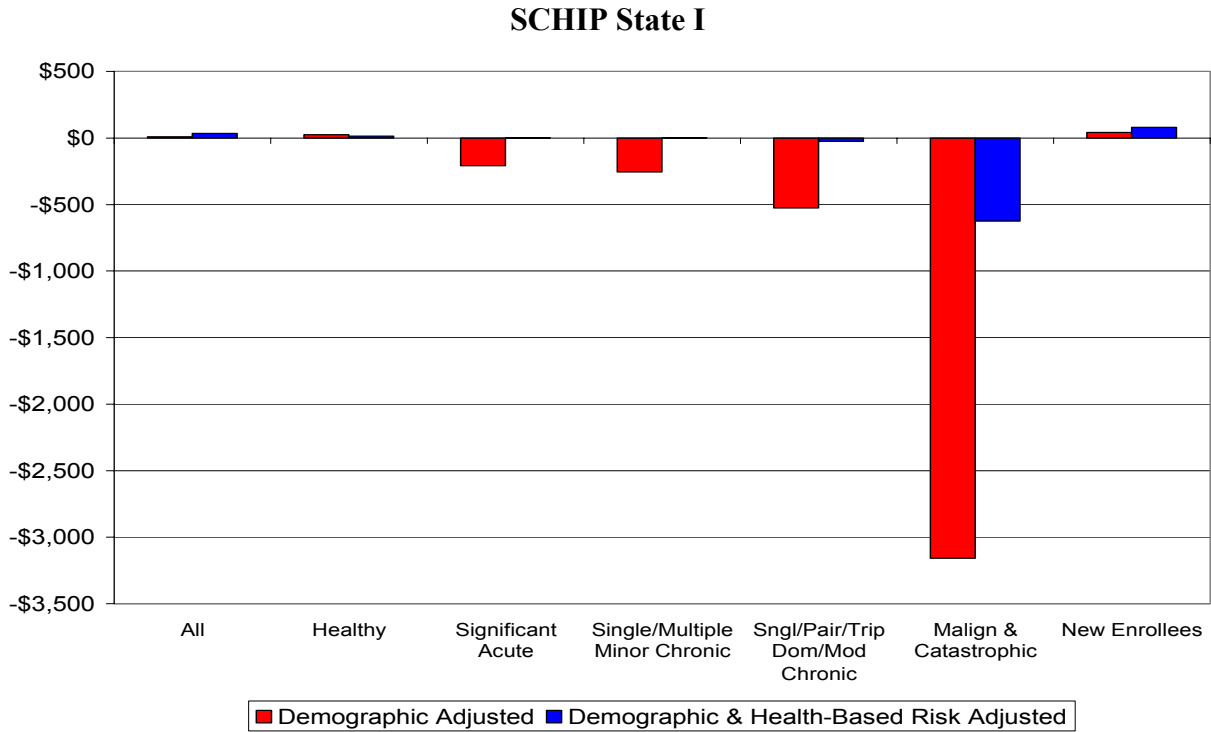
In contrast, when demographic and health-based risk adjustment strategies are used jointly, the over and underpayments are reduced substantially, but not eliminated, for the different CRG categories. For example, in SCHIP in State I, the underpayment for children with a moderate chronic condition declines from \$525 when only demographic-based risk adjustment is employed to \$25 when risk adjustment is based on both CRGs and demographic factors.

### ***Key Points: Payment Alignment***

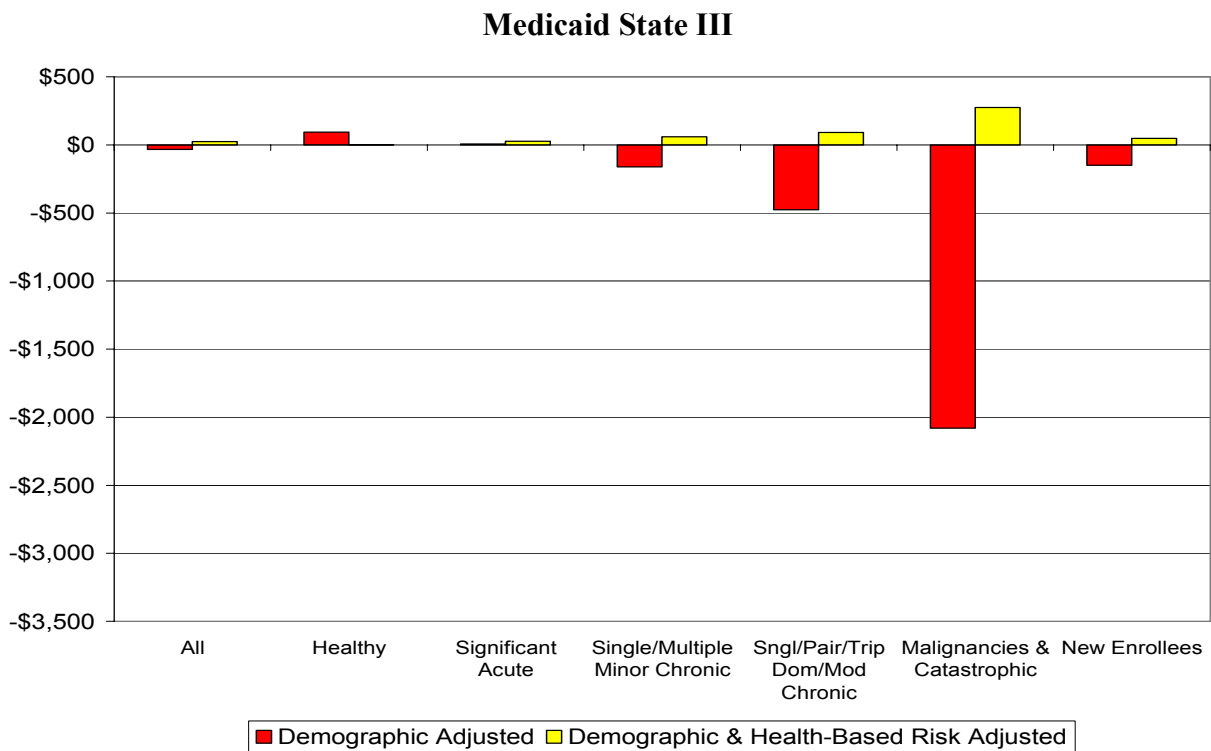
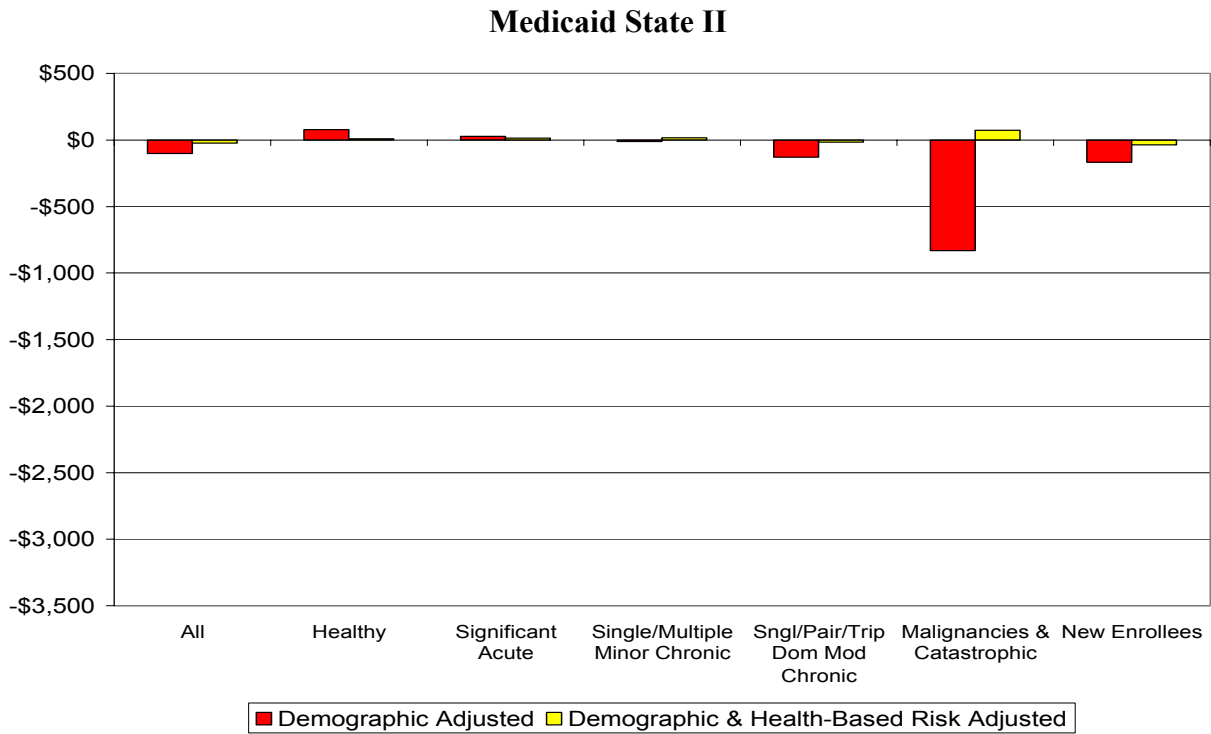
- When only demographic-based risk adjusters are used, the overall PMPM payments result in little to no losses for health plans. However, the incentive to risk select or to avoid high cost enrollees still exists because the health plans still can face very large net underpayments for children in the more severe condition categories.
- When demographic and health-based risk adjusters are used jointly, the PMPM payments are more closely aligned to the children's health status categories, thereby reducing underpayments. The incentives of health plans to risk select are reduced because health plans do not face large losses when caring for the sickest children.



**Graph 5. SCHIP States I & II—Overpayments or Underpayments PMPM for Each Risk Group and for New Enrollees When Using Demographic and Health-Based Risk Adjustment Compared to Demographic-Based Adjustment.**



**Graph 6. Medicaid States II & III— Overpayments or Underpayments PMPM for Each Risk Group and for New Enrollees When Using Demographic Health-Based Risk Adjustment Compared to Demographic-Based Risk Adjustment.**



## ***The Impact of Health-Based Risk Adjustment on Variability in Net Payments for SCHIP and Medicaid***

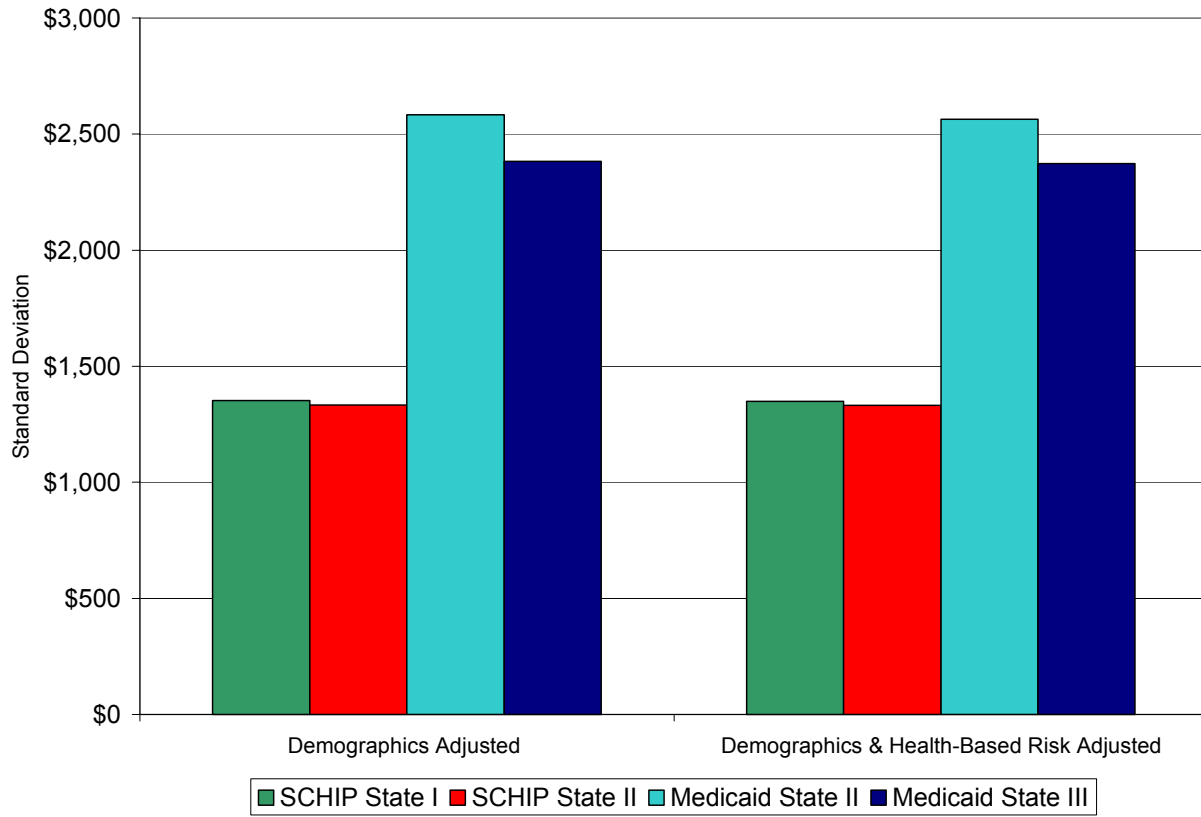
As noted above, when CRGs are employed to calculate capitated payments to health plans, higher payments are made on behalf of children with the most severe health problems. Consequently, health-based risk adjustment limits the financial loss that a health plan is likely to incur when caring for the sickest children. However, Graphs 3 through 6 only considered the average PMPM payment for each of the CRG health status categories. Substantial research has demonstrated that within chronic condition categories, children's health can vary significantly, resulting in substantial variability in health care expenditures (Stein and Jessop, 1990). This variability in severity within health status categories and the attendant variability in health care expenditures can result in significant financial losses to health plans, and motivate them to avoid the least healthy enrollees.

Graph 7 depicts the substantial variability in net payments that persists in our sample after adjusting capitated payments to reflect: (1) demographic factors alone; and (2) both demographic factors and CRGs. Graph 7 reveals, for example, that even under a risk adjustment strategy that considers both CRGs and demographic factors, health plans caring for Medicaid enrollees in State II could experience a standard deviation in PMPM net payments of \$2,500. The variability in net payments is less pronounced, but still substantial, for the SCHIP populations.

### ***Key Points: Net Payment Variability***

- Although demographic and health-based risk adjustment strategies together more closely align health plan payments to actual expenditures than do demographic-based risk adjustment strategies, substantial variability in net payments remains under both types of risk adjustment.
- Combined demographic and health-based risk adjustment does not reduce the variability in net payments substantially below the variability secured via demographic risk adjustment alone. Consequently, demographic and health-based risk adjusting do not eliminate a health plan's incentive to avoid the least health CSHCN.

**Graph 7. Variation in Net Payments PMPM Relative to Expenditures by Program and Risk Adjustment Strategy.**



## *Overview of Carve-Out Strategies*

This section analyzes both service and disease carve-out strategies. For service carve-outs, we focused on pharmacy, skilled nursing, and physical, occupational, and speech therapy carve-outs. For the disease carve-out, children with malignancies and catastrophic conditions were carved out from the capitation payment.

We assumed that the service or disease carve-out is financed on a fee-for-service basis while all other health care services are financed using capitated payments derived from the various reimbursement strategies under consideration. Table 3 provides information on the number of children included in each carve-out and the total charges that are assumed to be financed on a fee-for-service basis for SCHIP and Medicaid.

For each carve-out strategy, we compare the performance of the carve-out used alone, the carve-out used in combination with the demographic risk adjustors, and the carve-out used in combination with demographic and health-based risk adjustors in (1) aligning payments to health status categories, (2) reducing over and underpayments for children in the different health status categories, and (3) minimizing variability in over and underpayments. Because the results for the different carve-out strategies exhibit similar patterns, only the results for pharmacy and malignant and catastrophic condition carve-outs are shown. The results for the skilled nursing and therapy carve-outs appear in Appendix B of Volume II.

As shown in Table 3, the numbers of children carved out of the capitation payments vary by the type of carve-out and by the program. For example, 784 children in SCHIP in State I would be carved out from the capitation payments for skilled nursing care; whereas 83 of them would be carved out for their care for malignant and catastrophic conditions. In contrast, for the Medicaid Program in State III, 115 children would have their skilled nursing care carved out from the capitation payment and 745 children would be carved out of the capitation payment due to malignant and catastrophic conditions.

The dollar amounts removed from the capitation payments to a presumed fee-for-service arrangement also vary widely depending on the carve-out used and the program. For example, if the children with malignant and catastrophic conditions were carved out of the capitation arrangement in SCHIP in State I, approximately \$6 million would need to be financed through some other arrangement. In contrast, children with malignant and catastrophic conditions in Medicaid in State III, had almost \$37 million dollars in health care expenditures that would need to be financed outside of the capitation payment. The differences in the amounts that needed to be financed were related, in part, to the different volumes of children in the malignant and catastrophic condition categories in the two state programs.

**Table 3: Number of Children in the Carve-Out Pool and Their Carved-Out Charges in Title XXI and Title XIX Programs**

Carve-Out	STATE I	STATE II		STATE III
	SCHIP Title XXI	Medicaid Title XIX	SCHIP Title XXI	Medicaid Title XIX
<b>Skilled Nursing</b>				
Number of Children in the Pool	784	703	175	3115
Percent of All Children	0.46%	0.21%	0.04%	1.19%
Skilled Nursing Charges	\$179,900.19	\$157,331.25	\$71,466.66	\$1,063,924.66
Percent of All Charges	0.09%	0.03%	0.01%	0.21%
<b>OT, PT &amp; ST</b>				
Number of Children in the Pool	1898	532	51,052	3862
Percent of All Children	1.13%	1.84%	10.29%	1.47%
OT, PT & ST Charges	\$1,030,818.56	\$440,217.54	\$14,586,807.62	\$875,198.06
Percent of All Charges	0.55%	1.35%	2.14%	0.17%

**Table 3(Continued): Number of Children in the Carve-Out Pool and Their Total Charges in Title XXI and Title XIX Programs**

Carve-Out	STATE I	STATE II		STATE III
	SCHIP Title XXI	Medicaid Title XIX	SCHIP Title XXI	Medicaid Title XIX
<b>Pharmacy</b>				
<b>Number of Children in the Pool</b>	9,337	263,154	314,808	159,005
<b>Percent of All Children</b>	5.53%	77.90%	63.43%	60.64%
<b>Pharmacy Charges</b>	\$4,240,178.72	\$83,087,433.52	\$116,982,690.48	\$57,868,504.51
<b>Percent of All Charges</b>	2.25%	14.24%	19.36%	11.50%
<b>Malignant and Catastrophic Conditions</b>				
<b>Number of Children in the Pool</b>	83	245	580	745
<b>Percent of All Children</b>	0.05%	0.07%	0.12%	0.28%
<b>Malignancies &amp; Catastrophic Charges</b>	\$6,001,182.17	\$8,480,216.47	\$23,835,173.98	\$36,689,868.01
<b>Percent of All Charges</b>	3.18%	1.45%	3.95%	7.29%

### ***Pharmacy and Catastrophic Condition Carve-Outs for SCHIP and Medicaid: Payment Alignment to Health Status Categories***

The following series of graphs illustrate how well pharmacy carve-outs (Graphs 8 and 9) and malignant and catastrophic condition carve-outs for SCHIP and Medicaid populations (Graphs 10 and 11) align PMPM payments to the various health status categories. The same pattern is observed for each of the programs and for the two different carve-out strategies (pharmacy and malignant and catastrophic conditions), although the specific dollar amounts vary.

When used alone or with demographic-based risk adjusters only, both carve-out strategies result in the same PMPM payment for the children, regardless of their condition or health status category. For example, with the pharmacy and malignant and catastrophic condition carve-outs in SCHIP in State II, the PMPM is about \$103 regardless of the children's health status classification.

The PMPM payments are aligned to the health status categories only when the carve-out strategy is combined with health-based risk adjustment. When the pharmacy carve-out strategy is combined with health-based risk adjustment, the PMPM is about \$76 for healthy children in SCHIP in State II and about \$400 PMPM for those with moderate chronic conditions. Similarly, when the malignant and catastrophic condition carve-out is used in SCHIP in State II, the PMPM payment is about \$76 for healthy children and about \$400 for those with moderate chronic conditions. The same pattern is seen for the other SCHIP and Medicaid Programs.

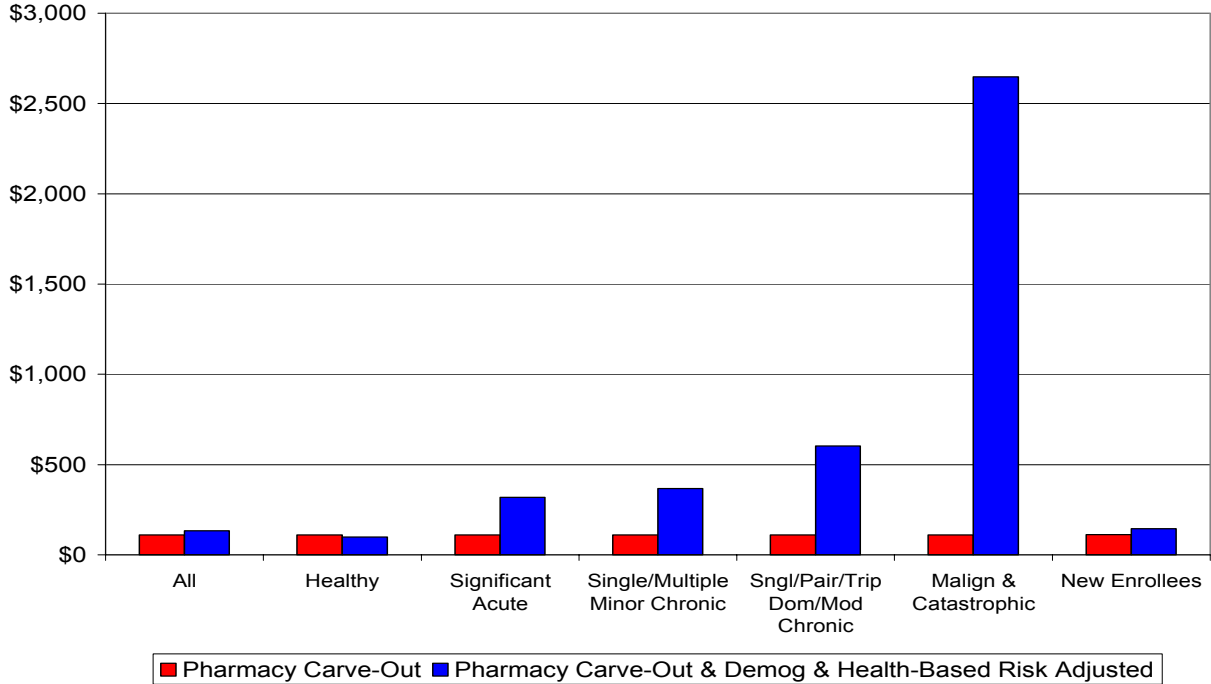
### ***Key Points: Payment Alignment with Pharmacy and Malignant and Catastrophic Condition Carve-Outs***

- Pharmacy, condition, and other carve-out types may have certain advantages but they are not effective in aligning PMPM payments to health status categories when used alone or with demographic-based risk adjusters.
- If states or health plans are interested in using different types of carve-outs, the carve-out strategy must be combined with health-based risk adjustment to achieve the goal of aligning payments to health status categories.

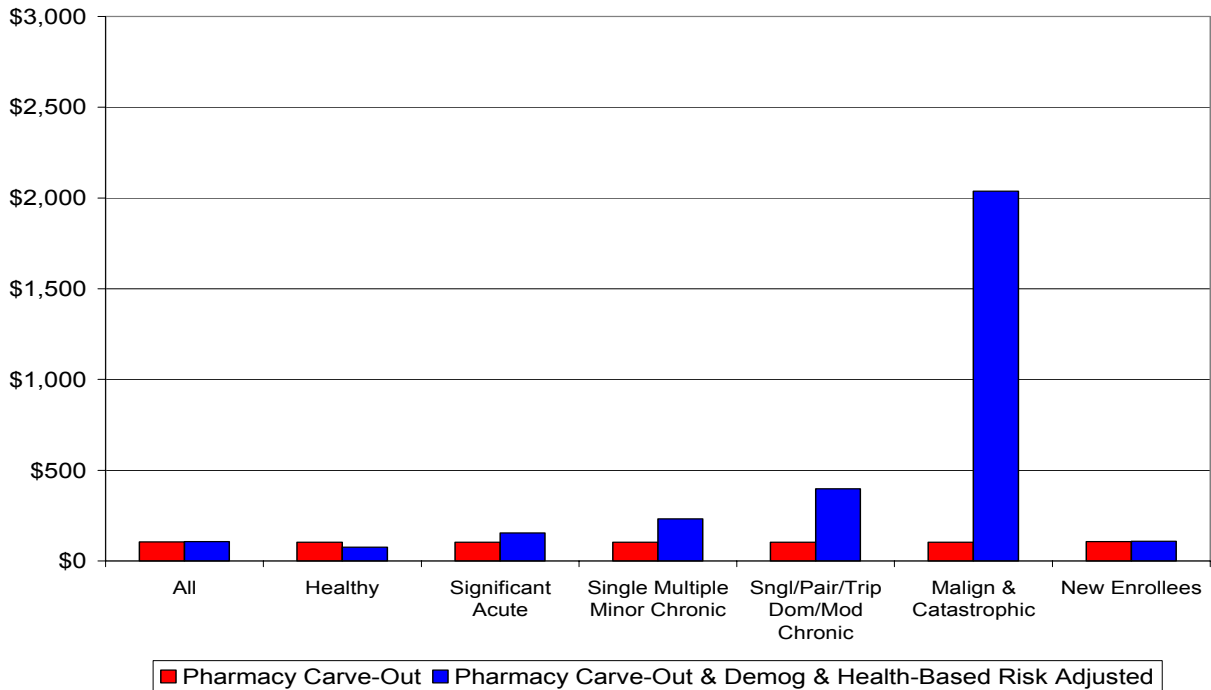


**Graph 8. SCHIP States I & II—Distribution of Capitated PMPM Payments by Risk Group and for New Enrollees Using Pharmacy Carve-Out and Health-Based Risk Adjustment.**

**SCHIP State I**

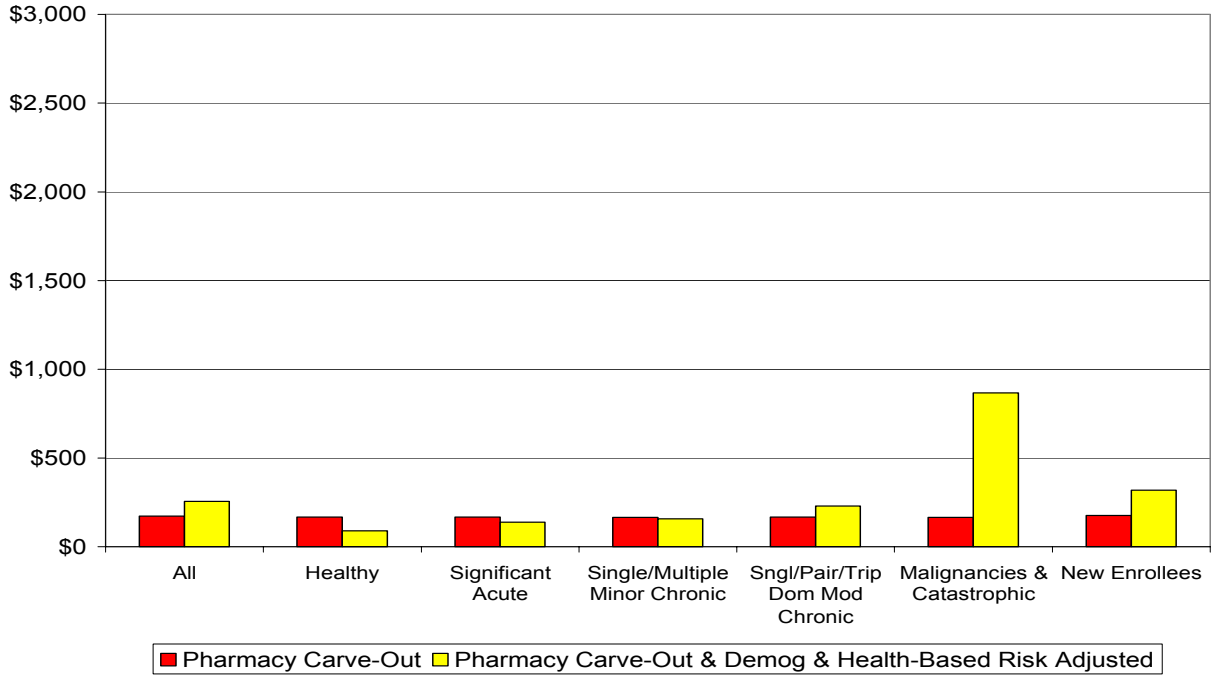


**SCHIP State II**

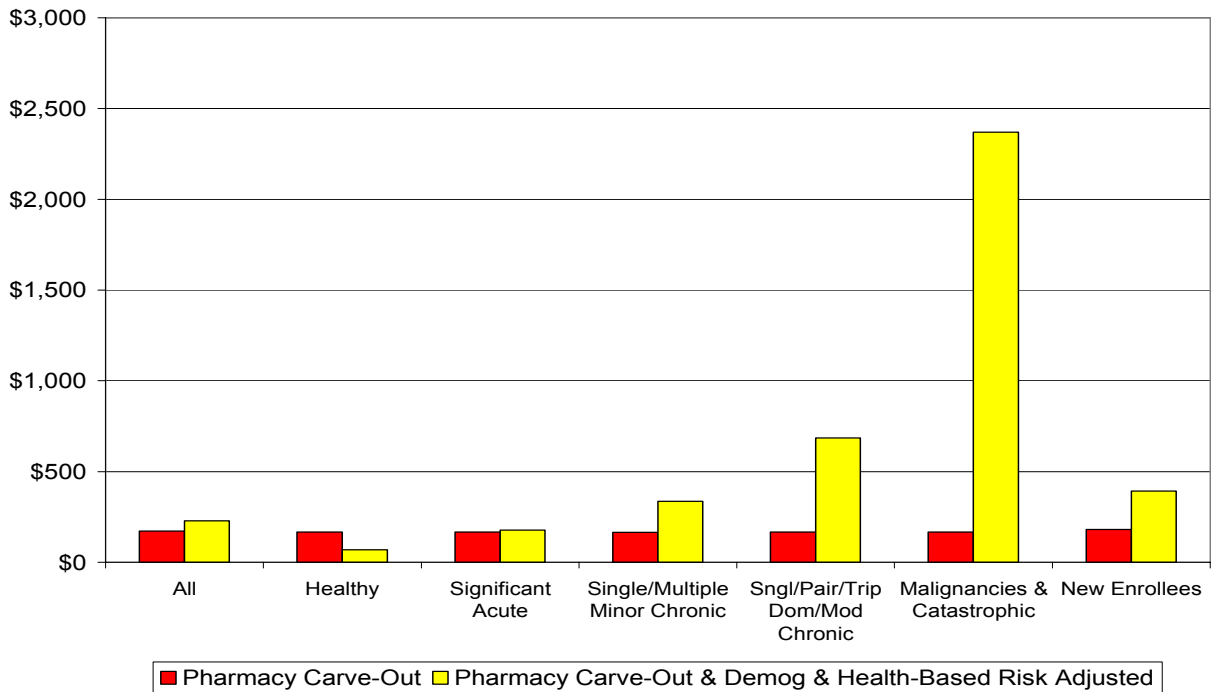


**Graph 9. Medicaid States II & III—Distribution of Capitated PMPM Payments by Risk Group and for New Enrollees Using Pharmacy Carve-Out and Health-Based Risk Adjustment.**

**Medicaid State II**

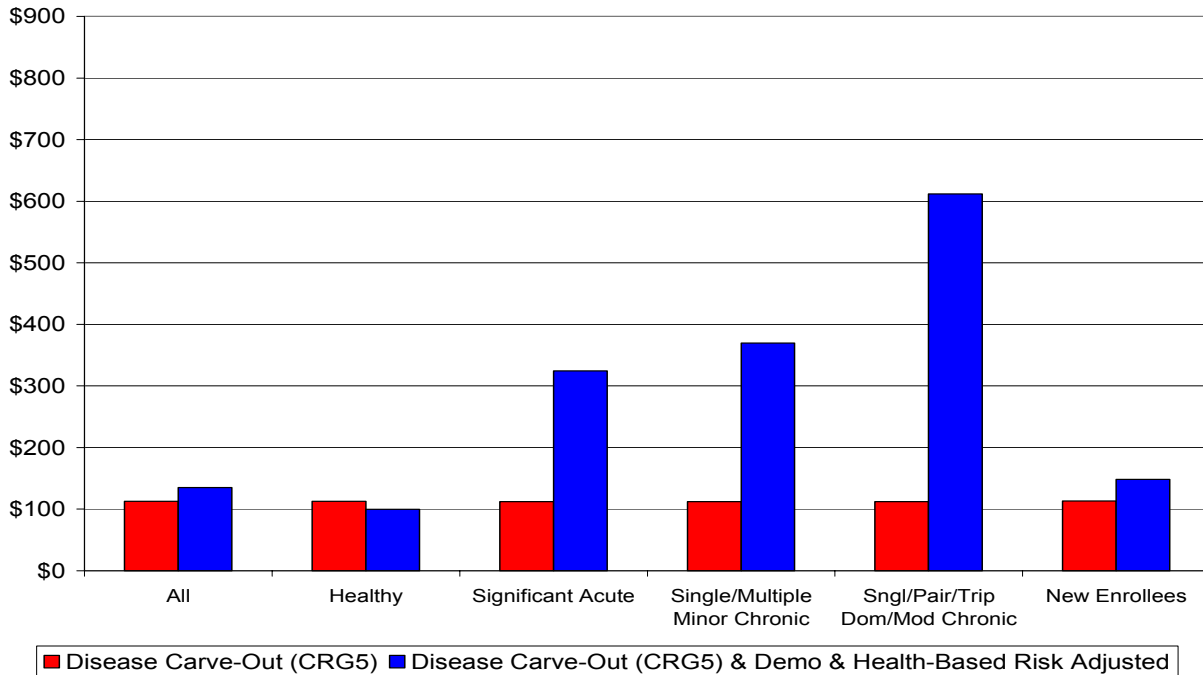


**Medicaid State III**

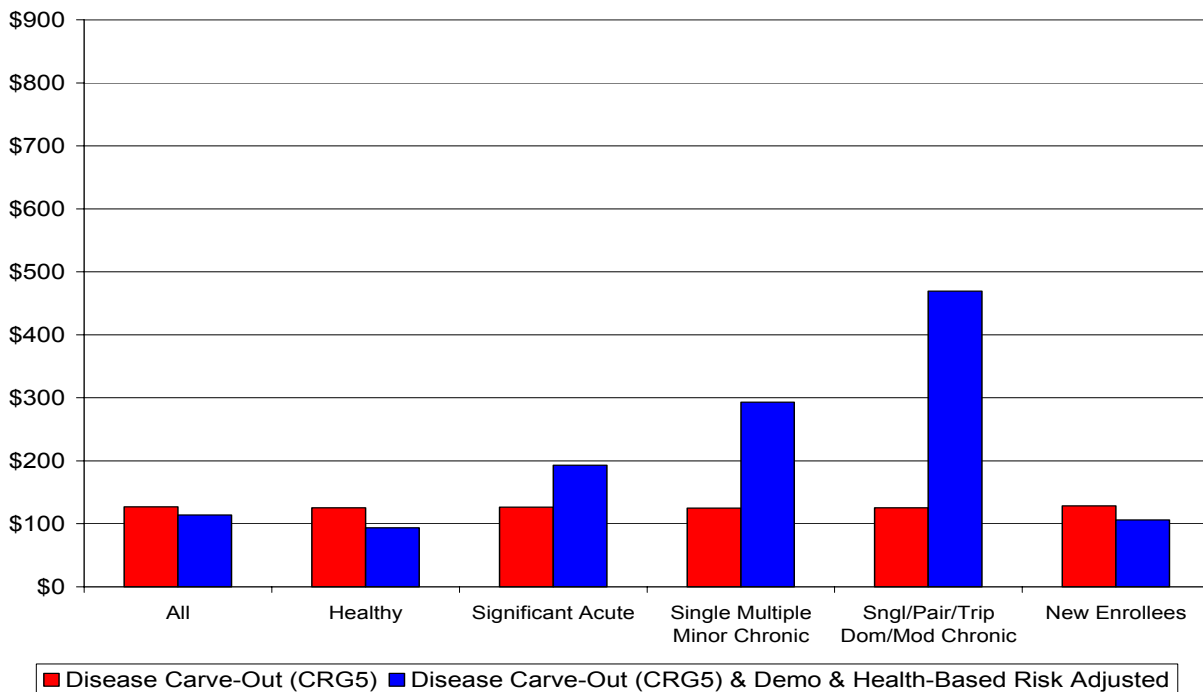


**Graph 10. SCHIP States I & II—Distribution of Capitated PMPM Payments by Risk Group and for New Enrollees Using A Catastrophic Condition Carve-Out and Health-Based Risk Adjustment.**

**SCHIP State I**

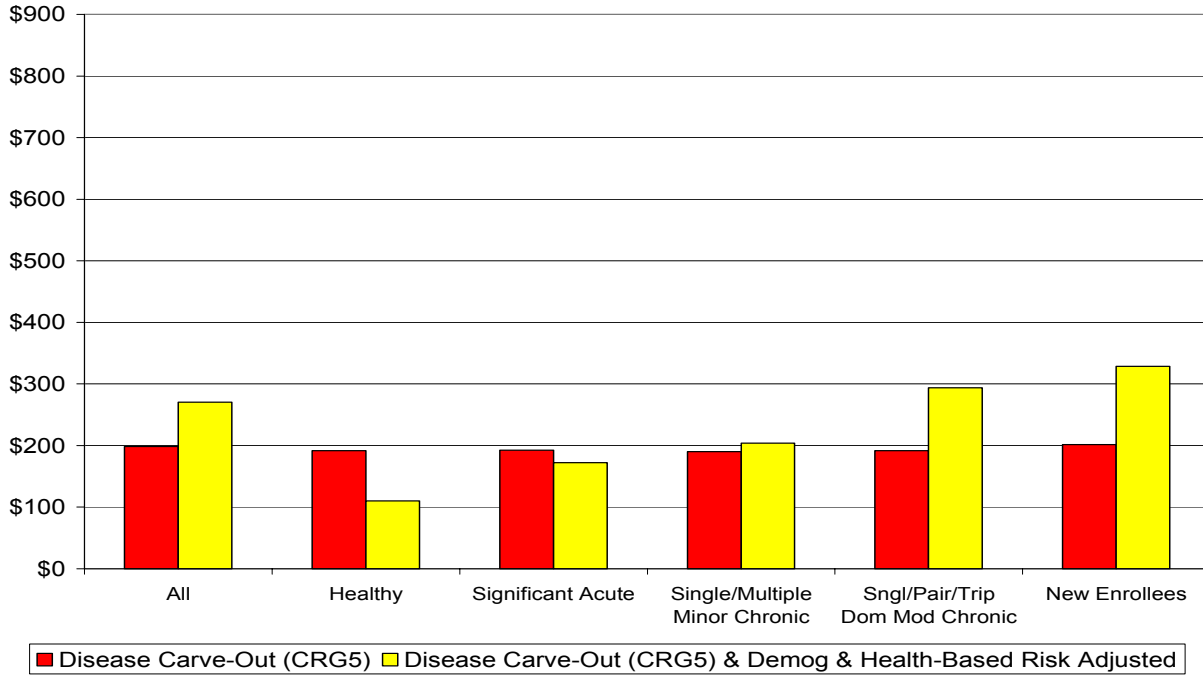


**SCHIP State II**

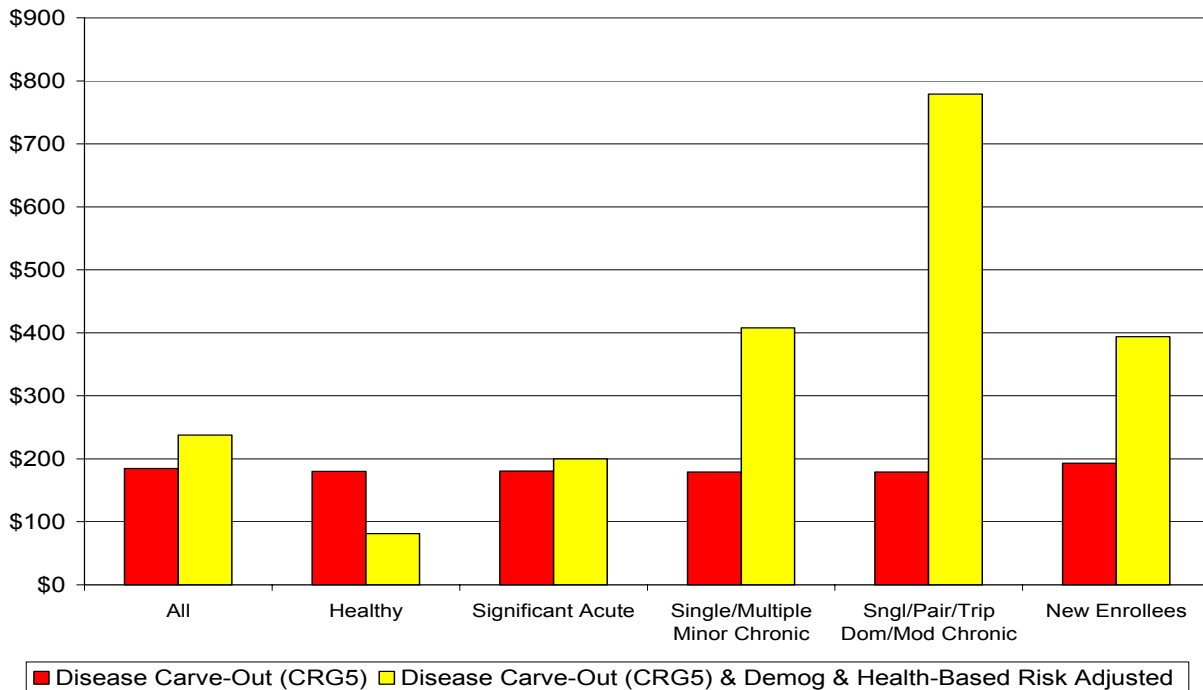


**Graph 11. Medicaid States II & III— Distribution of Capitated PMPM Payments by Risk Group and for New Enrollees Using A Catastrophic Condition Carve-Out and Health-Based Risk Adjustment.**

**Medicaid State II**



**Medicaid State III**



***Overpayments and Underpayments for Enrollees in SCHIP and Medicaid By Health Status Categories: Pharmacy and Condition Carve-Outs***

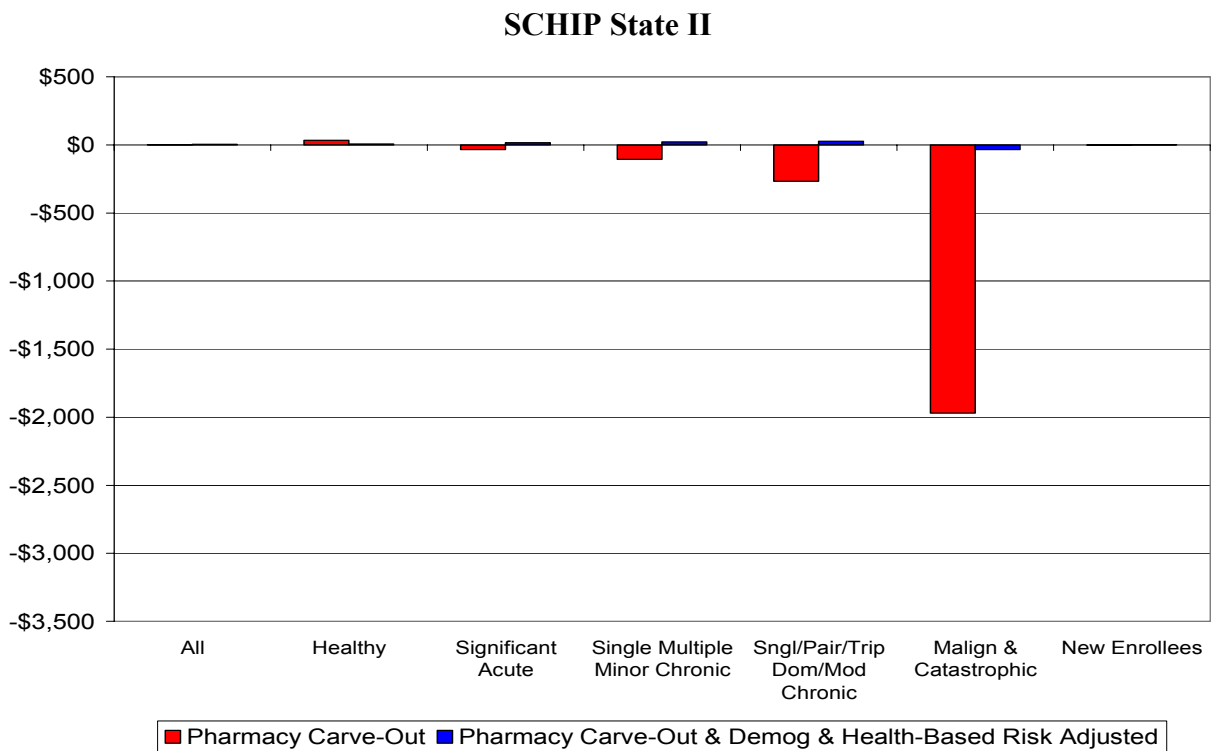
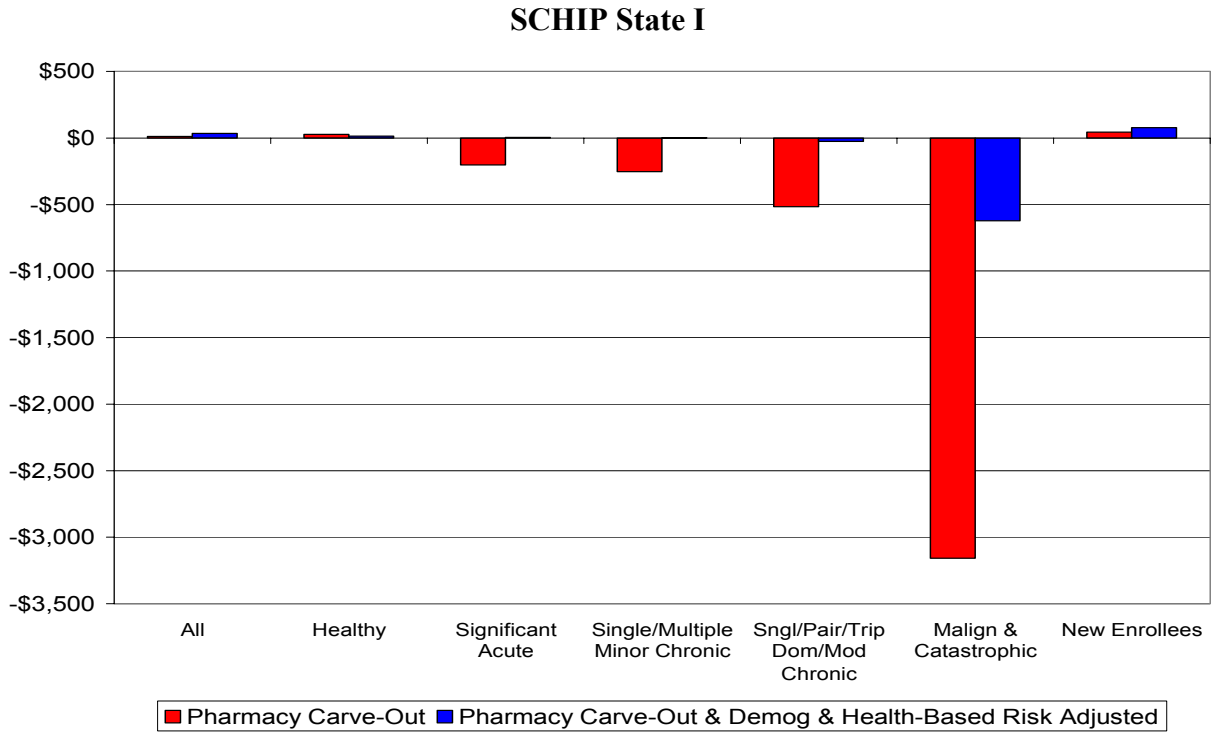
The performance of the pharmacy (Graphs 12 and 13) and malignant and catastrophic condition (Graphs 14 and 15) carve-outs in reducing net over and underpayments to health plans for enrollees in the different health status groups is illustrated in the graphs below. When used alone or with demographic-based risk adjusters, PMPM underpayments occur for most of the programs for most of the chronic condition categories. For example, net underpayments of \$500 for those with moderate chronic conditions in SCHIP in State I and Medicaid in State III are observed when the carve-out strategy is used by itself or with demographic-based risk adjusters.

In contrast, when the pharmacy carve-out strategy is used in combination with health-based risk adjustment, a slight net overpayment of \$27 occurs for those with moderate chronic conditions in SCHIP in State II. A similar net overpayment is seen for Medicaid enrollees with moderate chronic conditions in State II.

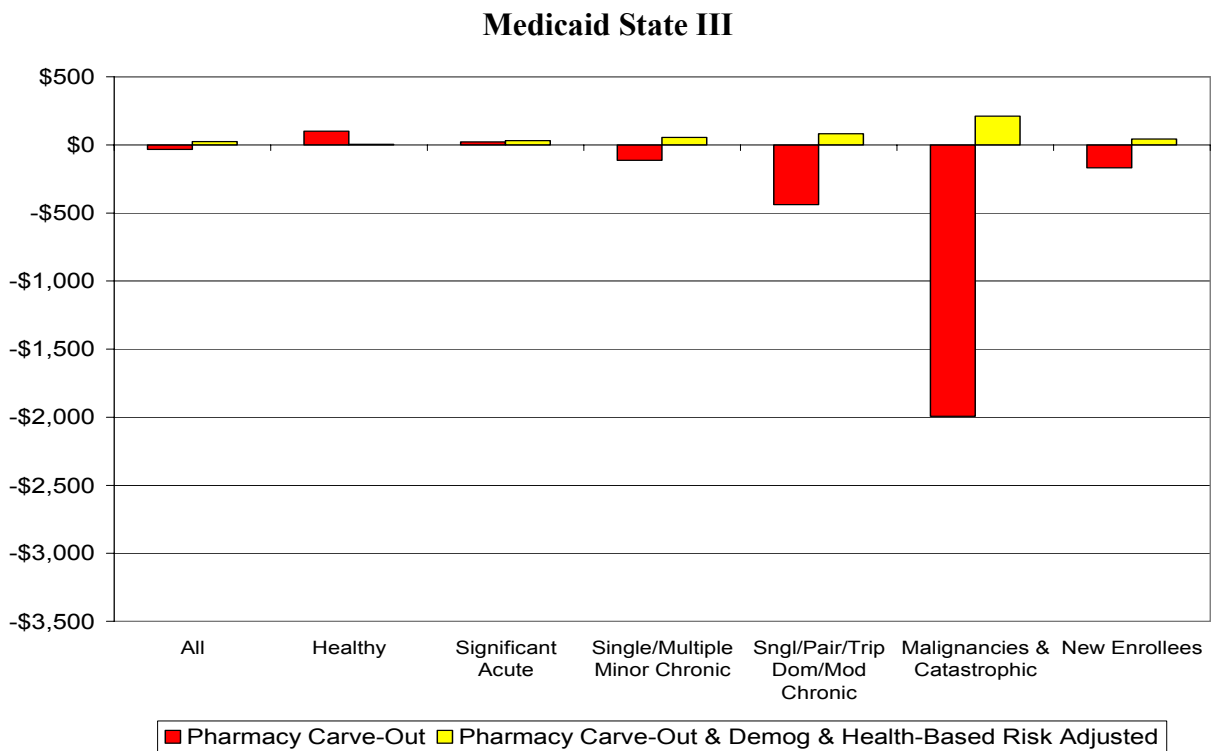
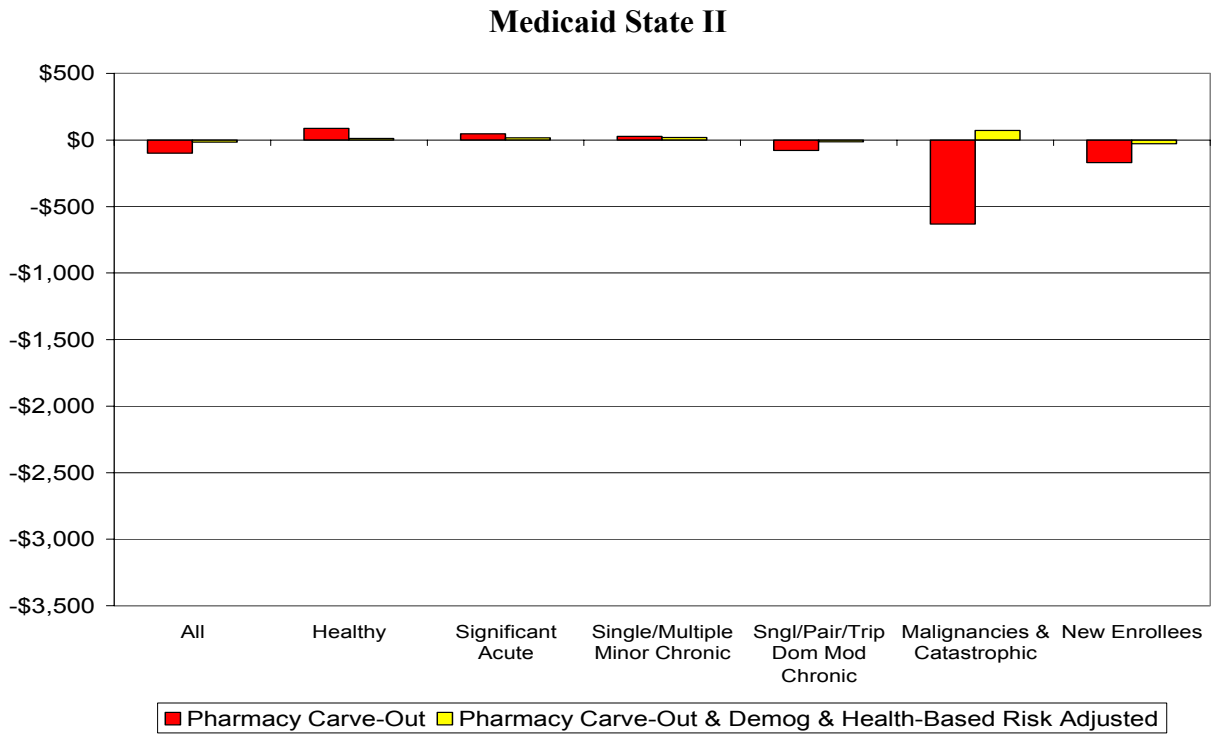
***Key Points: Overpayment and Underpayments with Pharmacy and Malignant and Catastrophic Condition Carve-Outs***

- Health plans remain at risk for underpayments when caring for children in the chronic condition categories if carve-out strategies are used either alone or in combination with demographic-based risk adjusters.
- Carve-outs used in combination with health-based risk adjustment reduce underpayments for children with chronic conditions.

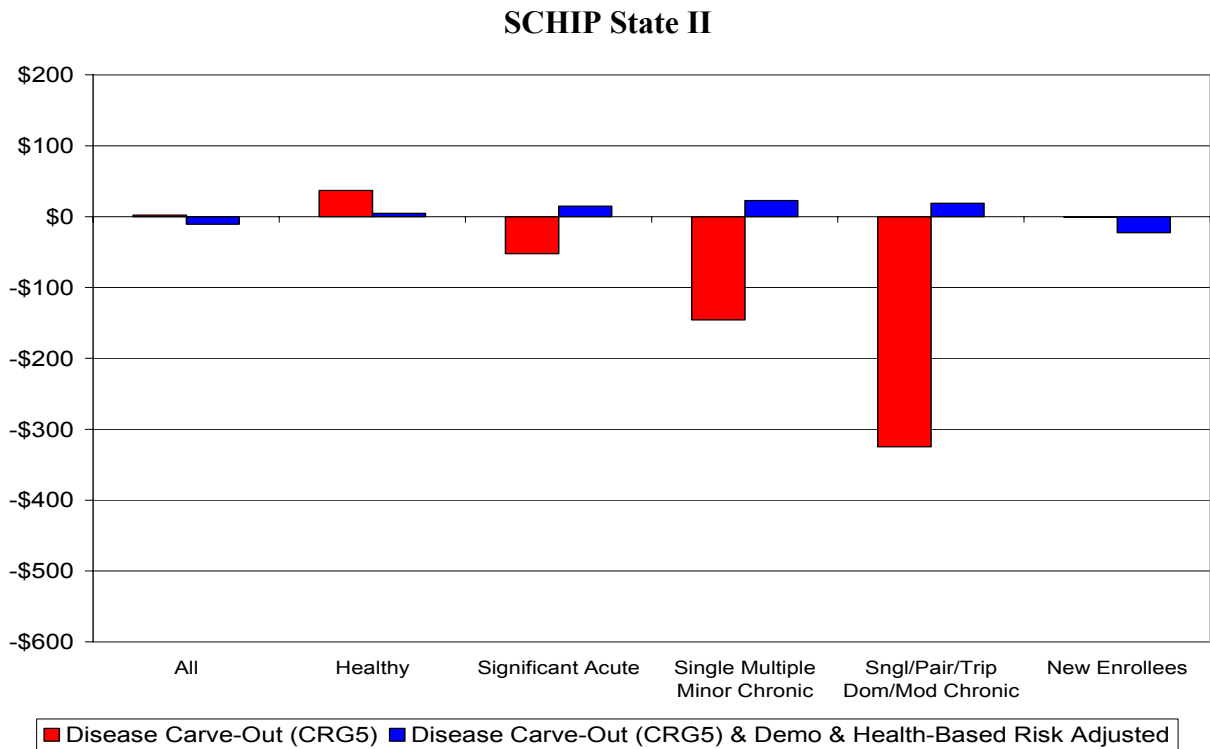
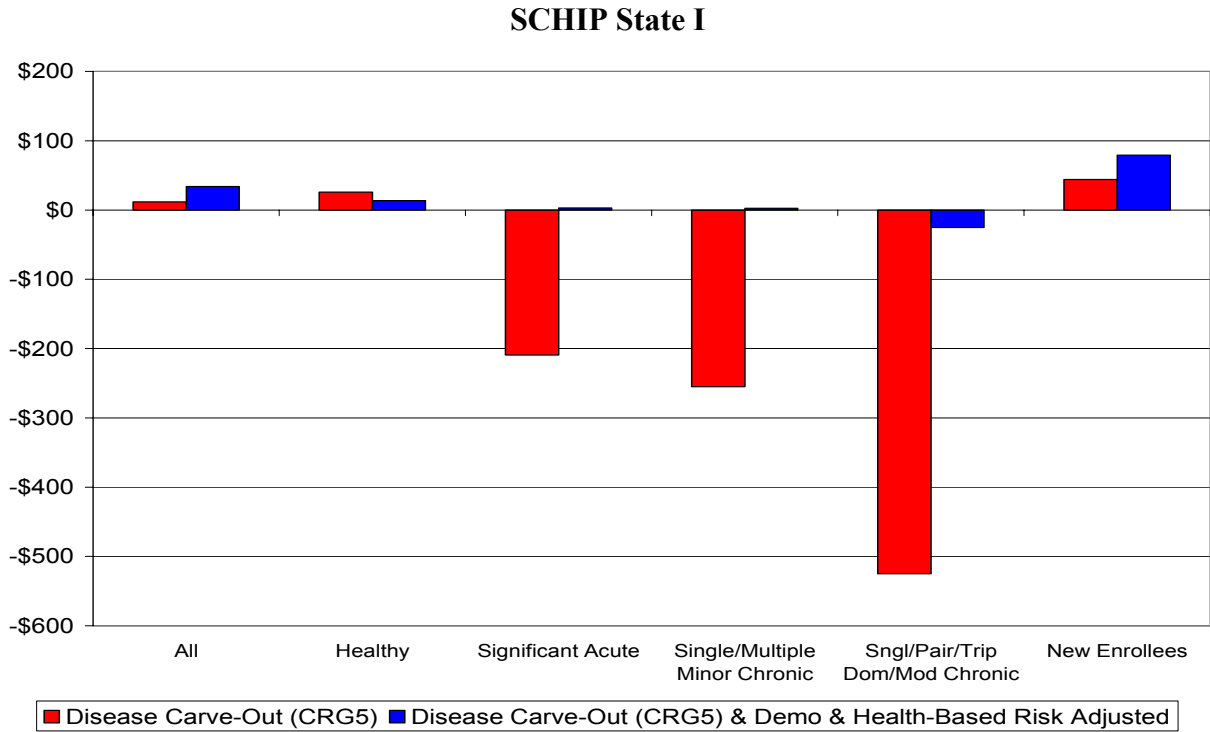
**Graph 12. SCHIP States I & II—Overpayments or Underpayments PMPM for Each Risk Group and for New Enrollees When Using a Pharmacy Carve-Out and Health-Based Risk Adjustment.**



**Graph 13. Medicaid States II & III— Overpayments or Underpayments PMPM for Each Risk Group and for New Enrollees When Using a Pharmacy Carve-Out and Health-Based Risk Adjustment.**

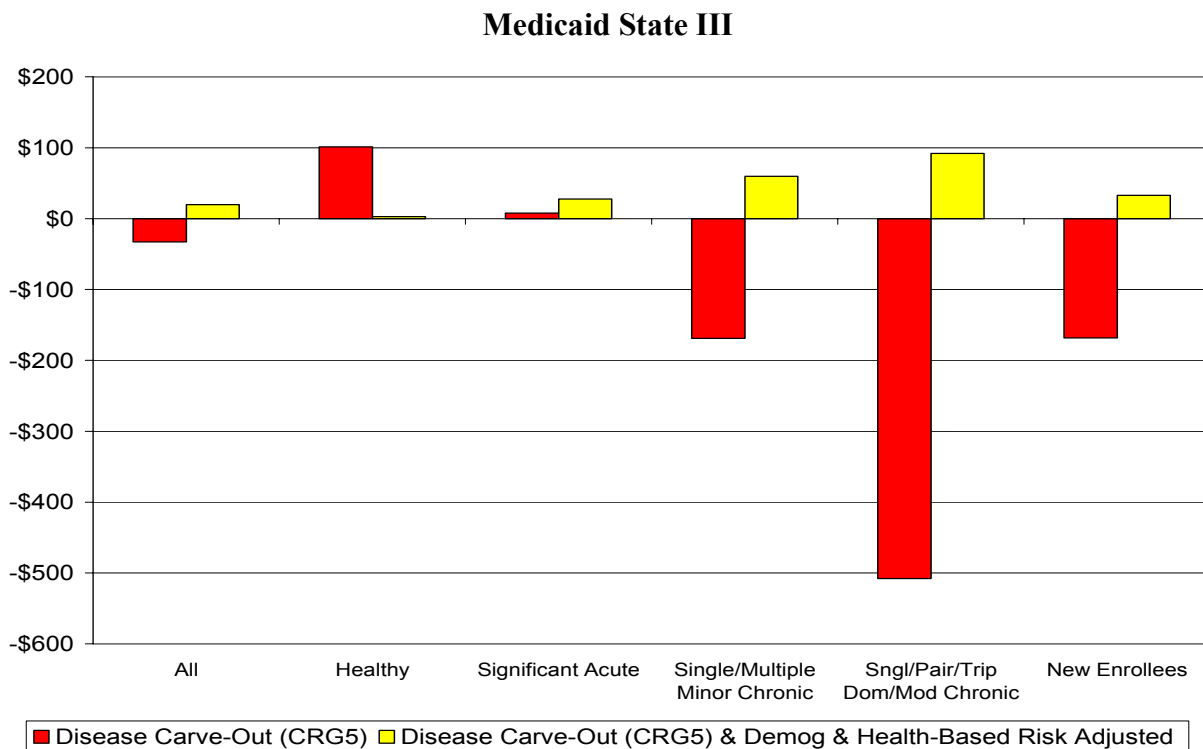
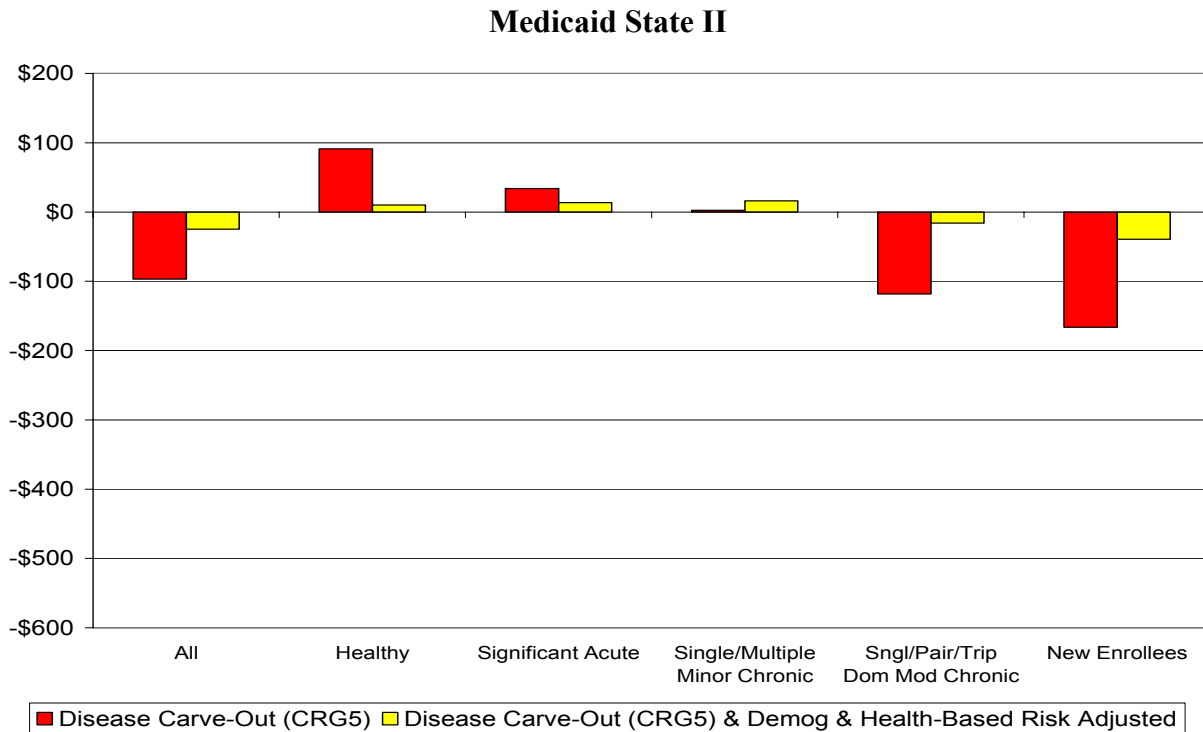


**Graph 14. SCHIP States I & II— Overpayments or Underpayments PMPM for Each Risk Group and for New Enrollees When Using a Catastrophic Condition Carve-Out and Health-Based Risk Adjustment.**





**Graph 15. Medicaid States II & III— Overpayments or Underpayments PMPM for Each Risk Group and for New Enrollees When Using a Catastrophic Condition Carve-Out and Health-Based Risk Adjustment.**



### ***The Impact of the Pharmacy and Malignant and Catastrophic Condition Carve-Out Strategy on Variability in Net Payments for SCHIP and Medicaid***

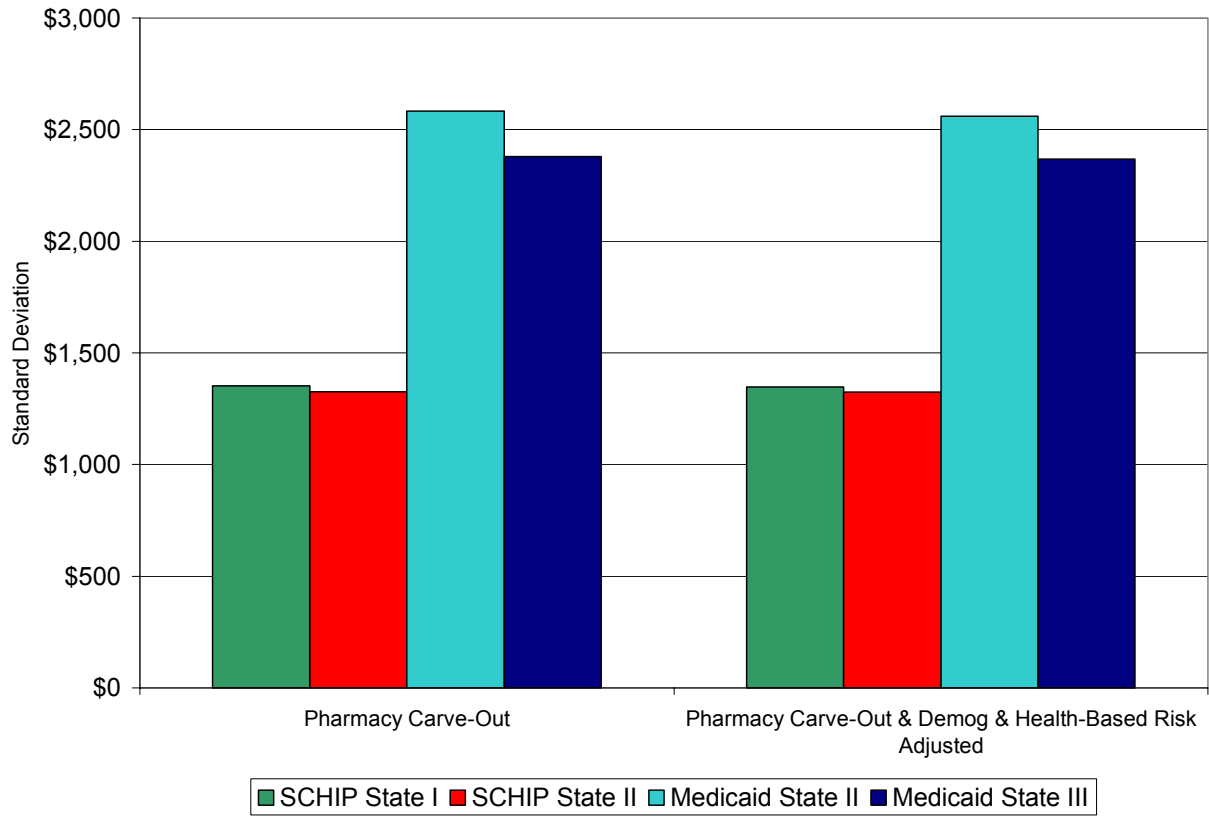
Graphs 16 and 17 present the variability in net payments for each program when the pharmacy and malignant and catastrophic condition carve-out strategy is used alone and when it is employed in combination with health-based risk adjustment. Recall, that the PMPM payments represent average payments for each health status category. However, expenditures on individual children will differ from the average expenditures, leading to variation in net payments.

The graphs reveal less pronounced variability in net payments for SCHIP enrollees than for Medicaid enrollees. However, all four programs experience substantial variability in net payments, regardless of the risk adjustment strategy used. In Medicaid in State II, for example, the standard deviation of the PMPM payments exceed \$3,000, potentially creating an incentive to avoid enrolling or caring for the sickest children.

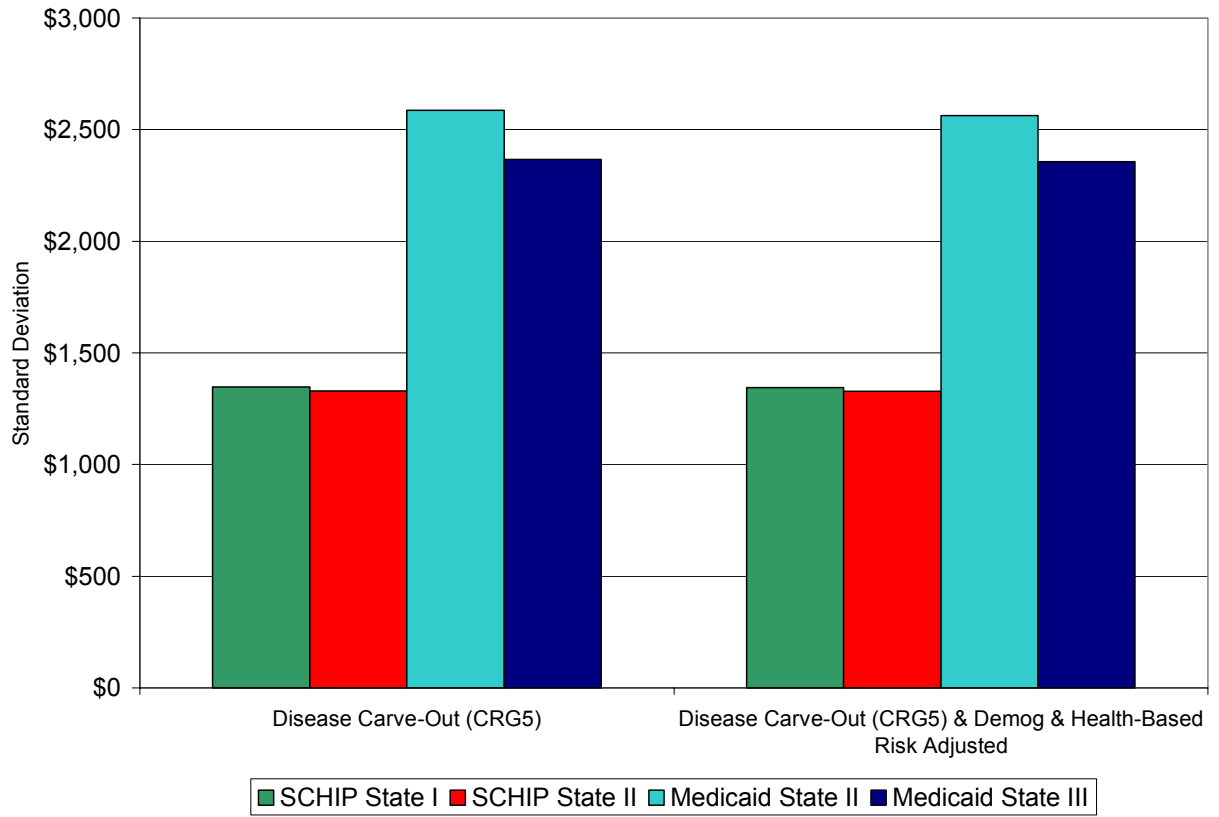
#### ***Key Points: Payment Variability with Pharmacy and Malignant and Catastrophic Condition Carve-Outs***

- Health plans caring for CSHCN will experience substantial variability in net payments when carve-outs are used alone or in combination with health-based risk adjustment. Thus, carve-out strategies will not eliminate the financial risk that health plans face when caring for CSHCN.

**Graph 16. Variation in Net Payments PMPM by Program and Pharmacy Carve-Out Strategy.**



**Graph 17. Variation in Net Payments PMPM by Program for the Malignancies and Catastrophic Conditions Carve-Out Strategy.**



## *Overview of Reinsurance Strategies*

In this section, a reinsurance strategy at the \$75,000 attachment point is presented. The results for \$50,000 and \$100,000 attachment points are contained in Appendix C, Volume II and are similar to those presented here. Reinsurance at a \$75,000 threshold or attachment point is used as the baseline case. The reinsurance strategy is also used in combination with demographic-based risk adjustment only and in combination with demographic and health-based risk adjustment.

The formulation of the reimbursement strategy assumes that capitated rates are used to cover all charges below the reinsurance limit. Charges beyond the insurance limit are assumed to be financed on a fee-for-service basis. Table 4 provides information on the number of children that would be placed in a reinsurance pool at the different attachment points and the charges that the reinsurance pool would incur in SCHIP and Medicaid.

Regardless of the threshold or attachment point used, less than 1% of the enrollee pool is affected by the reinsurance strategy. However, these children are a costly group. The annual health care expenditures for children who reached the \$75,000 threshold was about \$17 million for SCHIP in State I and \$109 million for Medicaid in State III.

**Table 4: Number of Children in the Reinsurance Pool and Their Reinsurance Charges in Title XXI and Title XIX Programs**

Reinsurance	STATE I	STATE II		STATE III
	SCHIP Title XXI	Medicaid Title XIX	SCHIP Title XXI	Medicaid Title XIX
<b>Reinsurance at 50K</b>				
Number of Children in the Pool	239	1,165	770	1,402
Percent of All Children	0.14%	0.34%	0.16%	0.53%
Reinsurance Charges for 50K	\$20,970,867.66	\$80,306,658.61	\$60,669,098.02	\$134,898,662.35
Percent of All Charges	11.12%	13.76%	10.04%	26.81%
<b>Reinsurance at 75K</b>				
Number of Children in the Pool	111	718	451	813
Percent of All Children	0.07%	0.21%	0.09%	0.31%
Reinsurance Charges for 75K	\$16,794,075.80	\$57,483,644.89	\$46,140,773.22	\$108,507,825.50
Percent of All Charges	8.90%	9.85%	7.64%	21.57%

**Table 4 (Continued): Number of Children in the Reinsurance Pool and Their Total Charges in Title XXI and Title XIX Programs**

Reinsurance	STATE I	STATE II		STATE III
	SCHIP Title XXI	Medicaid Title XIX	SCHIP Title XXI	Medicaid Title XIX
<b>Reinsurance at 100K</b>				
<b>Number of Children in the Pool</b>	68	482	321	585
<b>Percent of All Children</b>	0.04%	0.14%	0.06%	0.22%
<b>Reinsurance Charges for 100K</b>	\$14,718,936.39	\$42,687,397.92	\$36,611,371.09	\$91,389,110.98
<b>Percent of All Charges</b>	7.80%	7.31%	6.06%	18.17%

***Reinsurance at a \$75,000 Threshold for SCHIP and Medicaid: Payment Alignment to Health Status Categories***

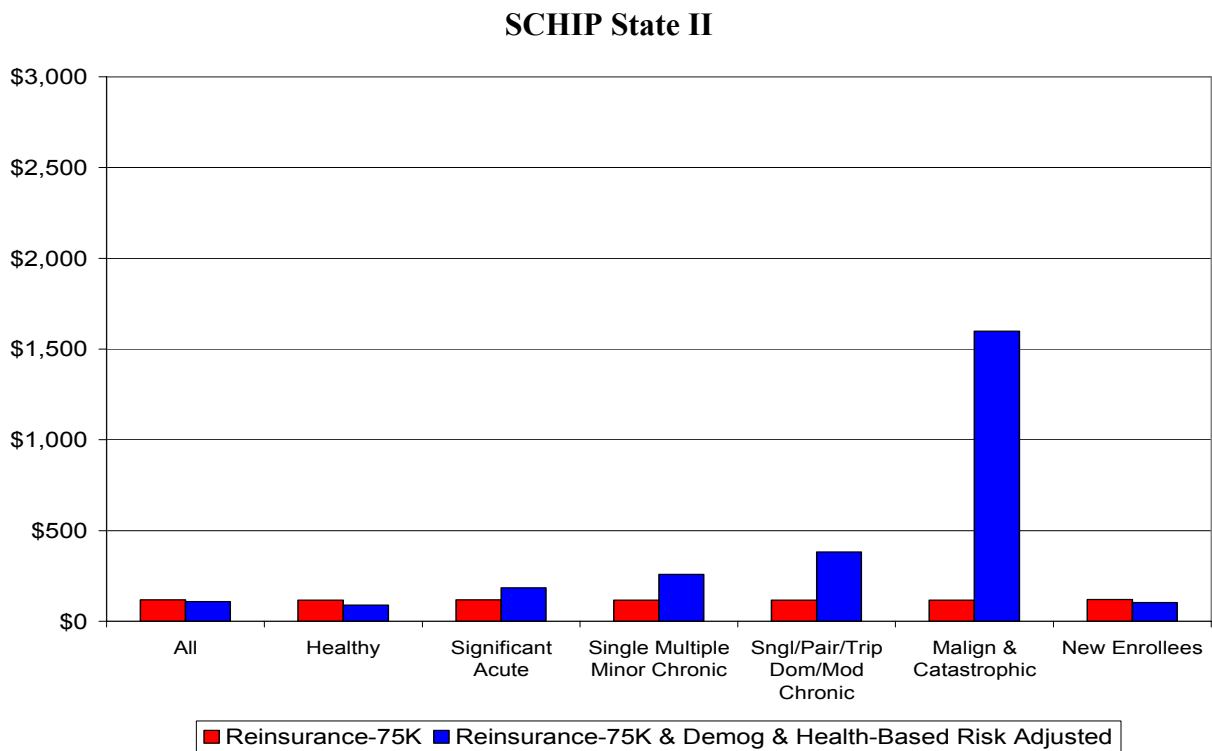
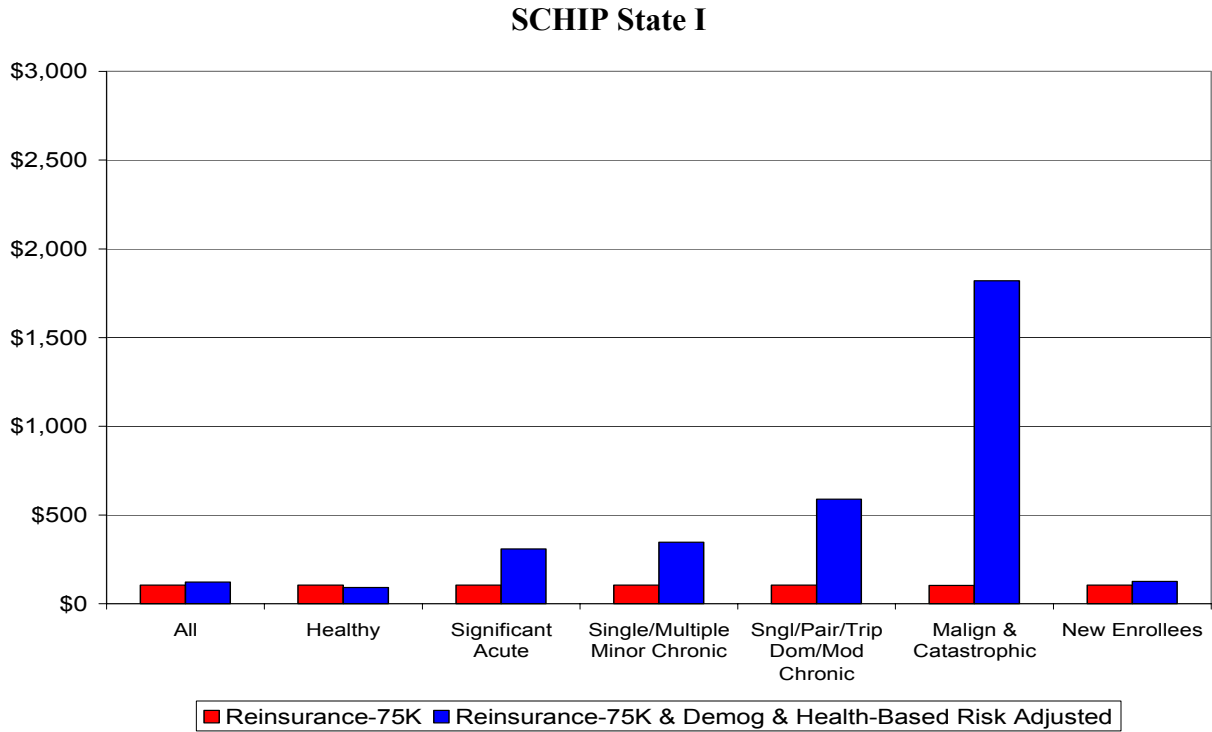
A familiar pattern is seen in Graphs 18 and 19. When used alone, reinsurance at the \$75,000 threshold results in the same PMPM payment regardless of the children's health status. This finding is consistent for each of the programs examined in this study and is consistent for all thresholds (See Appendix C, Volume II). When reinsurance is combined with health-based risk adjustment, payments are more closely aligned to the children's health status categories.

***Key Point: Reinsurance a \$75,000 and Payment Alignment***

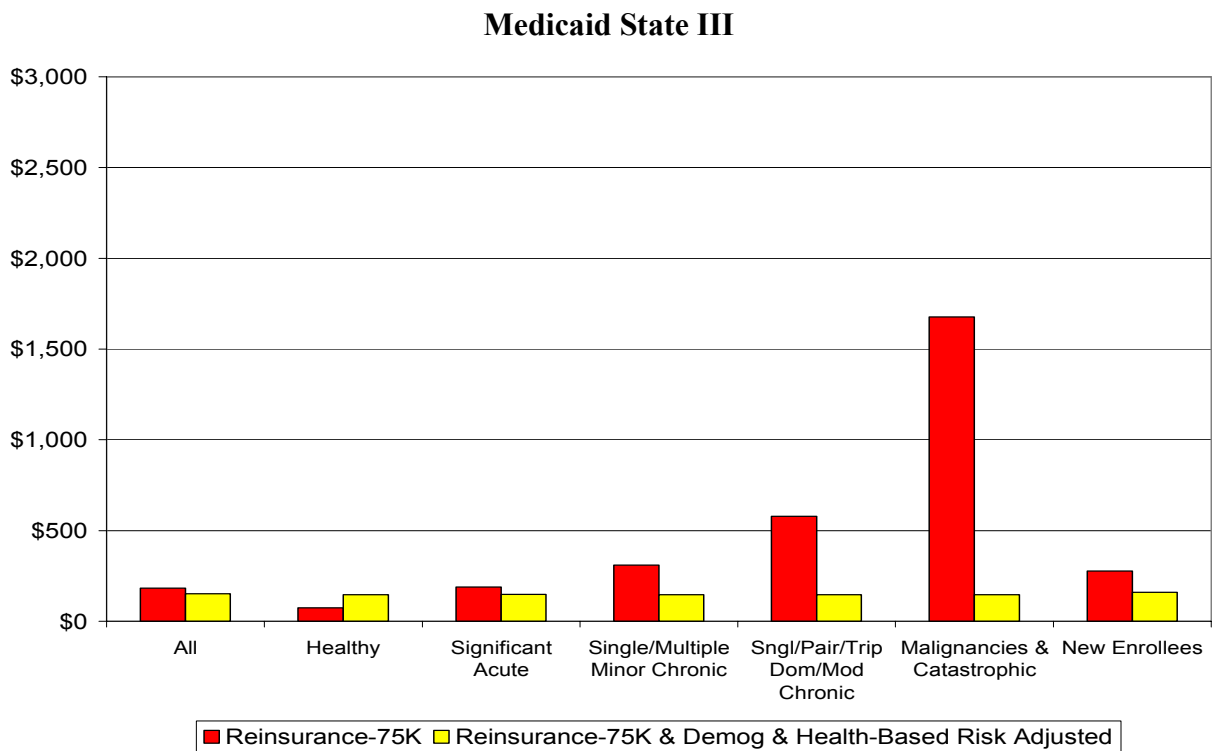
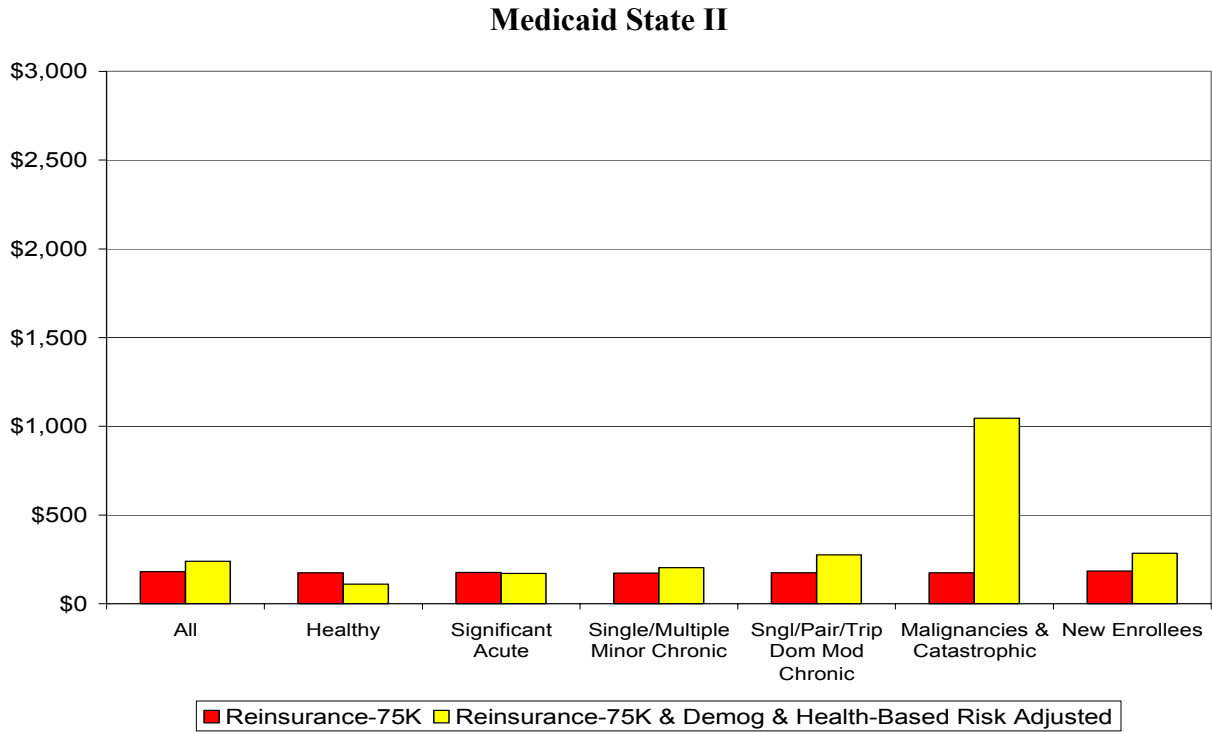
- When used alone as a financing strategy, reinsurance does not distribute PMPM payments more fairly according to the children's health status.



**Graph 18. SCHIP States I & II—Distribution of Capitated PMPM Payments by Risk Group and for New Enrollees Using Reinsurance at \$75,000 and Health-Based Risk Adjustment.**



**Graph 19. Medicaid States II & III—Distribution of Capitated PMPM Payments by Risk Group and for New Enrollees Using Reinsurance at \$75,000 and Health-Based Risk Adjustment.**



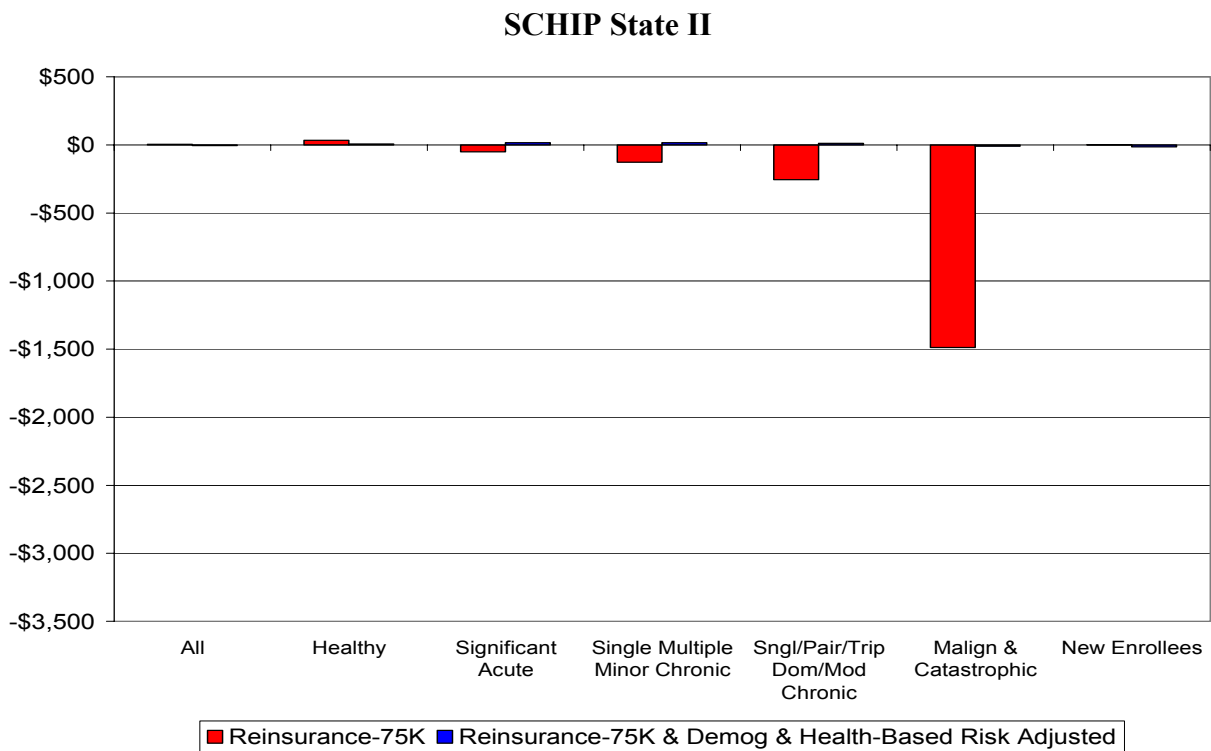
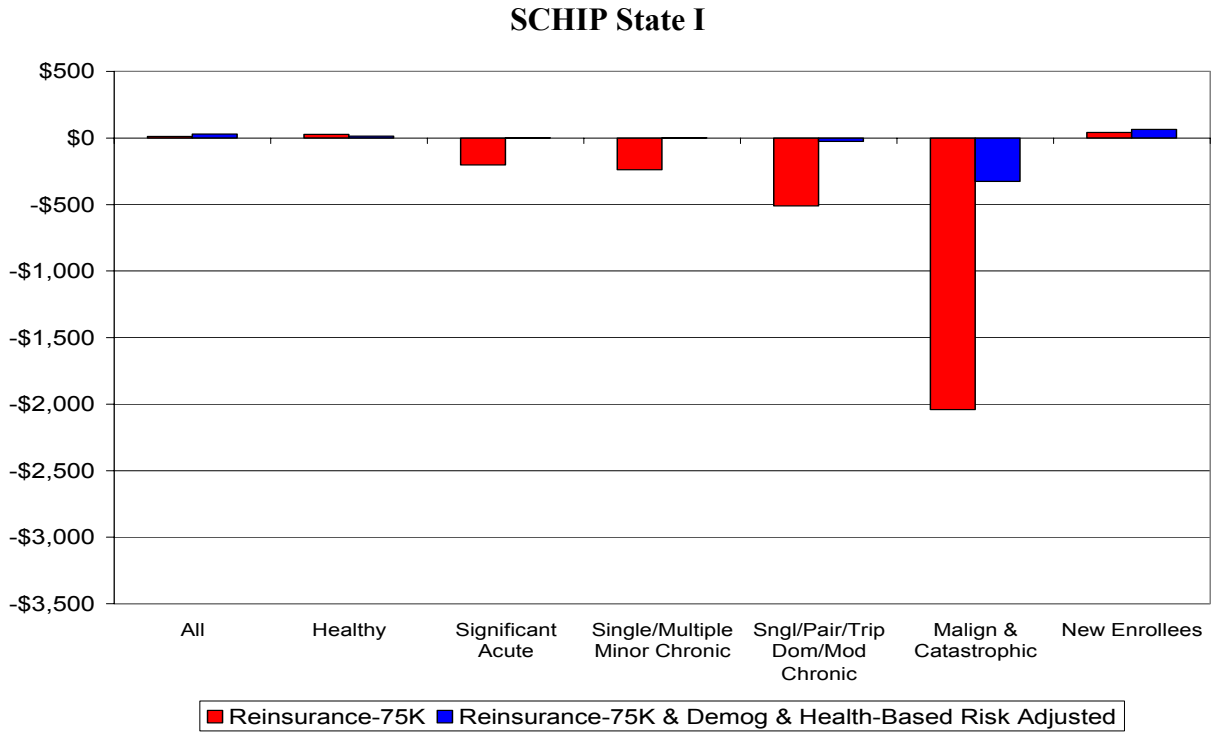
***Overpayments and Underpayments for Enrollees in SCHIP and Medicaid by Health Status Categories: Reinsurance at \$75,000***

Graphs 20 and 21 present the overpayments and underpayments for each health status category when reinsurance is used alone and in combination with health-based risk adjustment. Overpayments and underpayments occur for health plans caring for CSHCN when reinsurance is used alone. However, when reinsurance is combined with health-based risk adjustment, these overpayments and underpayments are reduced substantially. For example, in Medicaid in State II, underpayments of approximately \$771 PMPM occur for children with malignant and catastrophic conditions when reinsurance is the only strategy used. However, when reinsurance is combined with health-based risk adjustment, an overpayment of approximately \$100 PMPM occurs for children with malignant and catastrophic conditions.

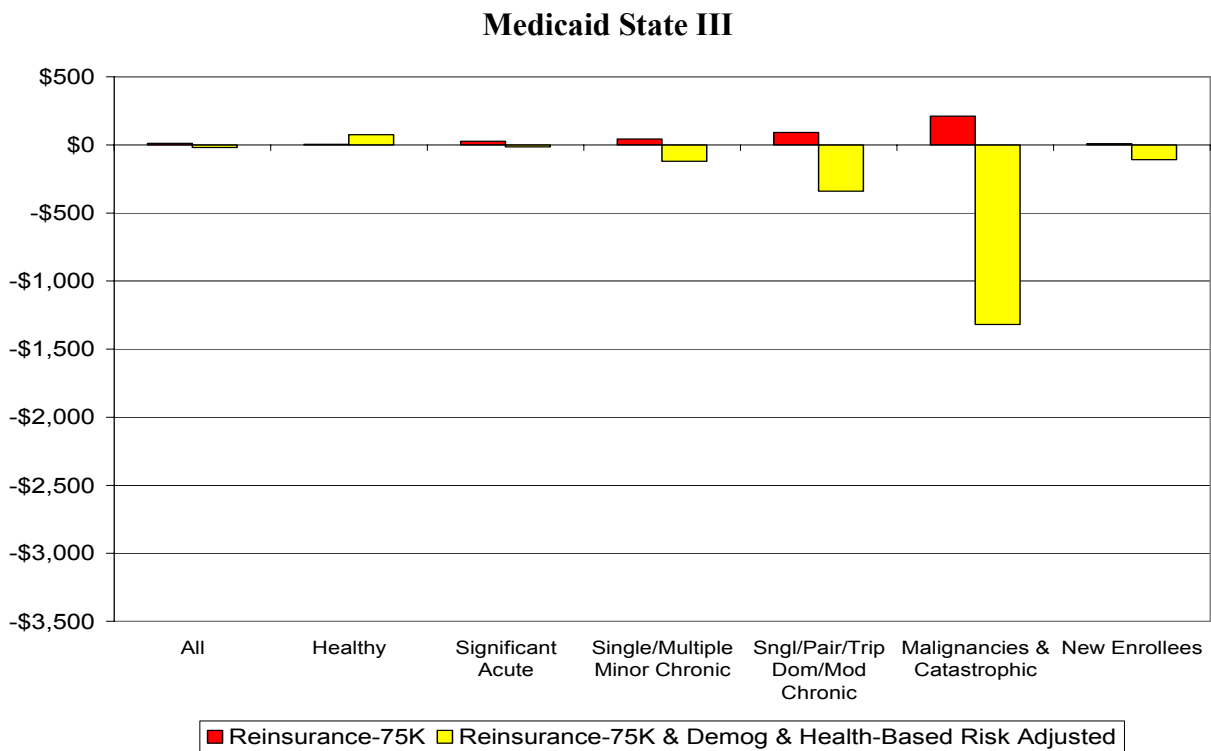
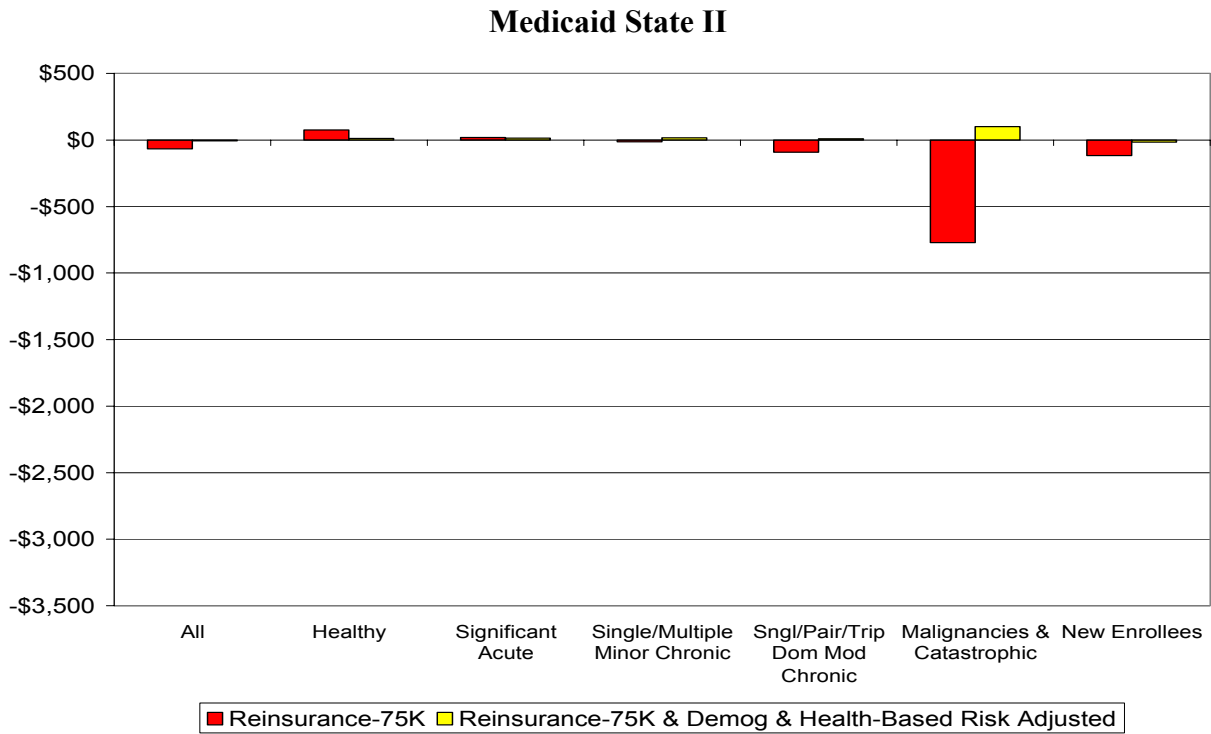
***Key Points: Overpayments and Underpayments with Reinsurance at \$75,000***

- When reinsurance is employed alone, overpayments and underpayments arise for children in the most severe health status categories. Reinsurance combined with health-based risk adjustment reduces substantially the magnitudes of overpayments and underpayments.

**Graph 20. SCHIP States I & II—Overpayments or Underpayments PMPM for Each Risk Group and for New Enrollees When Using Reinsurance at \$75,000 and Health-Based Risk Adjustment.**



**Graph 21. Medicaid States II & III—Overpayments or Underpayments PMPM for Each Risk Group and for New Enrollees When Using Reinsurance at \$75,000 and Health-Based Risk Adjustment.**



***The Impact of Reinsurance at the \$75,000 Threshold on Variability in Net Payments for SCHIP and Medicaid***

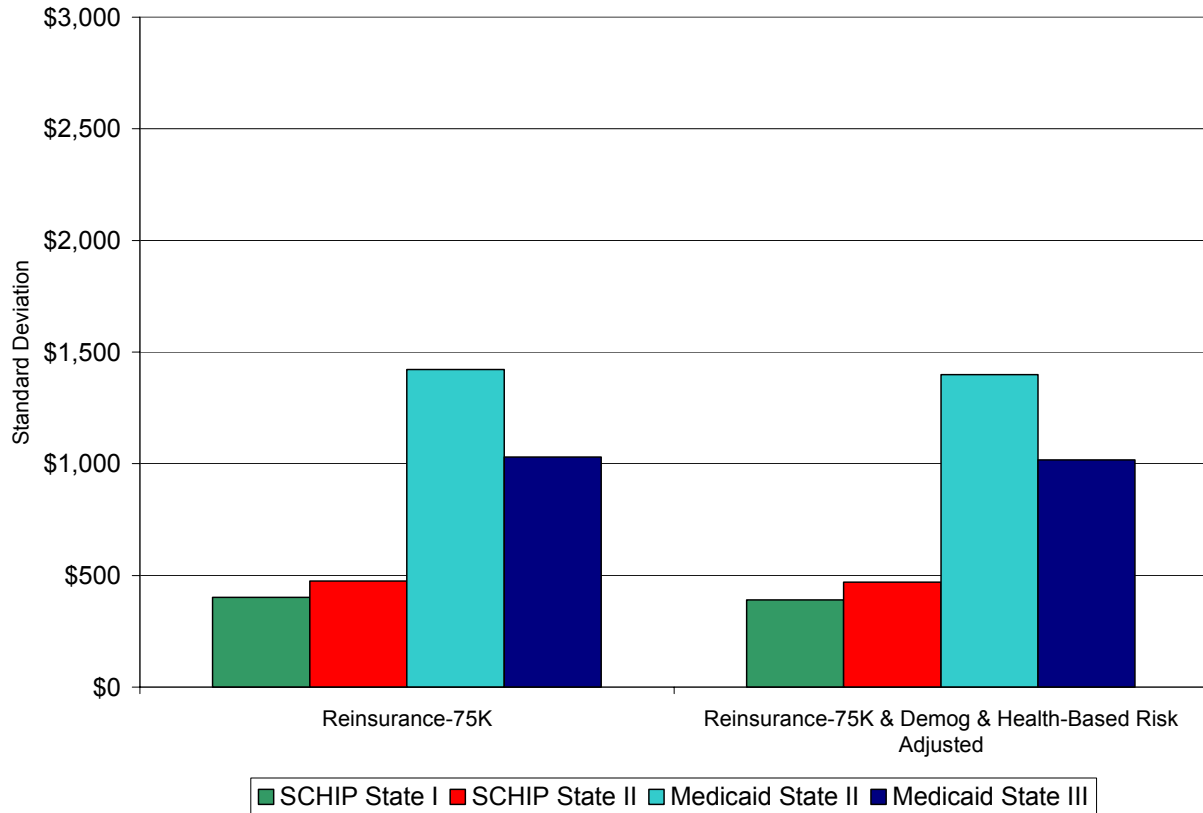
Graph 22 presents the variability in net payments when reinsurance is used alone and in combination with health-based risk adjustment. The variability is less pronounced in the SCHIP populations than in the Medicaid populations. The variability but is basically the same when reinsurance is used alone and when reinsurance is combined with health-based risk adjustment.

Most importantly, in contrast to the other reimbursement strategies considered in this report, reinsurance reduces substantially the variability in net payments. For example, when using demographic and health based-risk adjustment alone (without reinsurance), the standard deviation in net payments is approximately \$1,400 in SCHIP in State II and exceeds \$2,500 in Medicaid in State II. Similar variability in net payments arises under the carve-out strategies. In contrast, when reinsurance with a \$75,000 attachment point is employed, the standard deviation in net payments declines to less than \$500 for SCHIP and to less than \$1,500 for Medicaid.

***Key Points: Payment Variability with Reinsurance at \$75,000***

- Reinsurance reduces substantially the variability in net payments to health plans.

**Graph 22. Variation in Net Payments PMPM by Program and Reinsurance at \$75,000.**



## DISCUSSION

Although childhood chronic conditions are rare<sup>6</sup> CSHCN account for a disproportionate share of the health care expenditures in pediatric populations (Kuhlthau, Perrin, Ettner, et al., 1998). Until recently, the focus has been on developing financing and reimbursement strategies for the adult and elderly populations. While these groups have the greatest health care use and expenditures, a variety of forces are fueling a growing interest in the design of financing and reimbursement strategies for CSHCN. Over the last several years, states have enrolled CSHCN in a variety of managed care arrangements where the children potentially face restricted access to care due to strict controls placed on health care use and expenditures (Newacheck, Stein, Walker, et al., 1996). Developing strategies to ensure that health plans and providers receive appropriate payment when caring for CSHCN may diminish incentives to risk select, thereby preserving access to care for these vulnerable children. In addition, states are facing enormous fiscal pressures. Some of the states' efforts to control costs are directed toward SCHIP, where CSHCN comprise 17% or more of the enrollee pools (Szilagyi, Shenkman, Brach et al., 2004). This percentage is relatively high, given that CSHCN are believed to account for approximately 12% to 13% of the relevant populations in most states (Blumberg, Olson, Frankel, et al., 2003). Financing strategies that redistribute limited resources according to children's health status may be appealing to states as they address their fiscal constraints.

State Medicaid and SCHIP initiatives also face challenges in attracting health plans and providers to participate in their programs. Ensuring a medical home and good continuity of care is contingent upon building and retaining a strong provider network. About one-half of Medicaid and SCHIP health plans report difficulties in negotiating contracts with primary care providers and specialists, particularly pediatric sub-specialists (Gold, Mittler, Draper, and Rousseau, 2003). These difficulties can further reduce access to care for CSHCN. However, the problems in contract negotiations may be mitigated if reimbursement and financing strategies afford health plans and health care providers greater protection against financial risk.

Our study examined strategies that states commonly employ to reduce the reluctance of health plans to enter the Medicaid and SCHIP markets and to reduce financial incentives to risk select based on health status. These strategies include condition and service carve-outs. We also examined strategies used to protect against both largely unpredictable events that require large expenditures, and more predictable risks associated with caring for those with poor health status. These strategies include reinsurance (Lutzky and Bovbjerg, 2003). In addition, we examined the adjustment of capitated payments to health plans to reflect the health status of plan enrollees. Although few states presently employ such health-based risk adjustment, we found that this form of risk adjustment can help to structure capitated payments that more closely track ultimate health care costs.

Our initial focus on state programs such as Medicaid and SCHIP arose for three primary reasons. First, public insurance programs ensure large percentages of CSHCN (American Academy of Pediatrics, 2003). Second, CSHCN enrolled in public programs tend to be among the most vulnerable groups in our society. This is because, in addition to their poor health status,

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<sup>6</sup> Childhood chronic conditions occur at a rate of less than 1 in 1,000 (Perrin, 2002).



many CSHCN live below or near the poverty line, and CSHCN are disproportionately from minority backgrounds. Both low incomes and minority status have been shown to place children at a substantial disadvantage in receiving needed health care services (Shenkman, Pendergast, Reiss, et al., 1996; Shenkman, Wu, Nackashi, and Sherman, 2003). Third, most commercial insurers are reluctant to share the type of health care use data necessary to conduct analyses such as those conducted in this study. In contrast, state programs are more willing to participate in studies such as this one, although relevant data remains difficult to obtain.

Our focus on the payments that states make to health plans is a crucial first step because states must encourage health plans to enter the Medicaid and the SCHIP markets and deliver high quality health care to enrollees. By focusing on payments by states to health plans, our study lays a critical foundation for addressing financing and reimbursement strategies for a large and vulnerable group of CSHCN at a common point of entry into the health care system.

None of the three major reimbursement strategies (health-based risk adjustment, carve-outs, and reinsurance) in our study fully aligned health care payments with expenditures, regardless of whether the strategies were used in isolation or in combination with other strategies. However, health-based risk adjustment combined with reinsurance did substantially improve the alignment of payments to expenditures for children in different health status categories, when compared to the alignment provided by demographic risk adjustors alone. Although health-based risk adjusting helped to align average payments to average expenditures for groups of enrollees, it did not reduce the variability in net payment substantially. Consequently, health-based risk adjustment should not be viewed as a panacea for risk selection.<sup>7</sup> We found that health-based risk adjustment and reinsurance together reduced payment variability substantially.

The combination of health-based risk adjustment and reinsurance employs both ex ante and ex post reimbursement methods. Risk adjusting of the capitated payments provided to health plans constitutes an ex ante policy that reduces the incentive to risk select based on health status. Reinsurance is an ex post policy that affords protection against both unanticipated high expenses and anticipated high expenses associated with some health conditions (Walker, 2001).

We did not analyze the optimal design of reinsurance policy in the present study. We intend to analyze this important issue in future work. Most reinsurance policies require some continued cost sharing on the part of the health plan even after the attachment point has been attained. The cost sharing is introduced to limit incentives to provide excessive health care services to enrollees who are particularly costly to care for. Some reinsurance policies also require the use of specialized networks (Lutzky and Bovbjerg, 2003). As noted above, two states (Maryland and Florida) offer unique options for alternative financing and care coordination services for high-risk CSHCN. These state programs might be potential models of care for CSHCN who become part of the reinsurance pool.

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<sup>7</sup> This finding is consistent with findings in other studies that analyzed health-based risk adjustors (Shen and Ellis, 2002).

The focus in our report was on reinsurance for individual enrollees who reach certain thresholds or attachment points for cumulative expenditures in a year. However, some reinsurance policies define more narrowly expenses that are considered for reinsurance purposes (e.g., only inpatient expenses). In future work, we will examine the utility of considering the costs of a more narrow set of services when determining if reinsurance thresholds have been reached. We also will examine reinsurance for aggregate losses for an entire enrollee population and reinsurance that requires health plans to make coinsurance payments.

Although carve-outs are common in state programs, our study suggests that they may not closely align payments with health care expenditures. However, some carve-out policies may allow children to receive care within specialized networks. In principle, carve-outs also may reduce the risk of CSHCN not receiving specialized services like skilled nursing or therapies in the case of service carve-out models. Studies of the cost savings and quality of care within carve-out policies are limited and often plagued by questionable research design. Moreover, some have noted that condition specific carve-outs can lead to political battles about which groups are included or excluded in the carve-out policies (van Barneveld, Lamers, van Vliet, van deVen, 1998).

In addition to further work examining reinsurance and carve-out strategies, upcoming reports will address several critical issues related to financing and reimbursement for CSHCN, including the following five.

First, our present study does not address the behavioral implications of alternative reimbursement strategies. Some studies have found that changes in payment policies induce behavioral responses from provider. Some of these changes are positive, as when explicit financial incentives induce the delivery of increased preventive care to children (Hillman, Ripley, Goldfarb, et al., 1999). Others responses can be negative, as when the introduction of capitation induces reduced access to behavioral health services (Heflinger and Northrup, 2000). Future reports will incorporate relevant behavioral changes and analyze the potential impact of these behaviors on the costs and quality of care for CSHCN.

Second, our current analysis does not include financial incentives for meeting health care quality standards. Although we include modest incentives for the provision of preventive care and care coordination, these are automatically included in the capitation rate and are not paid only when predetermined standards are met. There are many quality of care indicators that can and should be assessed when caring for CSHCN. Some states withhold a portion of the health care premium and then redistribute it annually to health plans that meet specified quality of care standards (Michael Ballit, personal communication, 2003). There are many obstacles that need to be overcome to link financial incentives to the quality of care delivered, including risk adjusting the outcomes to account for those in poor health status, ensuring the adequacy of information systems (Dudley, Miller, Korenbrot, and Luft, 1998), and developing reliable and valid measures of the quality of care provided to CSHCN. However, there are some basic measures that are well-developed and essential for the care of all children, like preventive care and access to ambulatory care providers. We have begun analyses with the data used in this study to examine compliance with quality of care indicators among CSHCN compared to healthy

children. This information will be used in future work to suggest performance thresholds and to develop financial incentive options for health care quality.

Third, our calculations reflect the current system of care delivered to children enrolled in Medicaid and SCHIP in the three states in our study. There is great consistency in the findings across the states and between the Medicaid Programs and SCHIP initiatives in our study. The similarity in findings enhances our confidence in our recommendations about combining health-based risk adjustment with reinsurance as one approach for financing health care for CSHCN. While the benefit packages in these programs generally are comprehensive, we have not explicitly analyzed issues related to benefit package limitations, unmet health care needs, and families' out-of-pocket spending. Future research will address these issues.

Fourth, our current analysis does not examine explicitly the different effects that alternative reimbursement strategies might have on plans with different numbers of enrollees or different percentages of CSHCN. The impact of large health care expenditures on CSHCN typically are more pronounced for small health plans than for large ones, since large plans can spread financial risk over a larger pool of children. The health plans that participate in Medicaid and SCHIP range from small county-based plans to national insurers with large state-wide programs. These dynamics will be considered in future reports.

Finally, we will address the important issue of payment from health plans to providers. The models suggested by Sappington and Lewis (1999) and Dudley et al. (2003) may be useful at this reimbursement level. The provider typically has more in-depth knowledge about the children he or she cares for than is found in claims and encounter data. Creative ways to employ this superior information remain to be analyzed.

Our analysis of payments by health plan to providers will focus on the structure of such payments. There is increasing evidence that blended payment methods may be an appropriate way to reimburse physicians (Robinson, 2001). Fee-for-service may reward the provision of inappropriate services and up-coding of visits. In contrast, capitation may encourage inappropriate underutilization of services and dumping of high cost patients. Blended payments incorporate the use of capitation for some specified services with fee-for-service supplements for other carved out services and, at least in theory, can encourage delivery of the appropriate amount of health care. Blended payment models will be considered in our future analyses.

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