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# **Projecting the Cost of Health Coverage for Workers with Disabilities A new Medicaid program in North Carolina: Executive Summary, Report and Technical Appendix**

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## Health Coverage for Workers with Disabilities

The Ticket To Work and Work Incentives Improvement Act gives states the option to expand Medicaid to cover working adults with disabilities with earnings above the typical threshold, called a buy-in option. North Carolina passed legislation to implement Health Coverage for Workers with Disabilities (HCWD) in response to this opportunity (NC Session Law 2005-276). HCWD extends full Medicaid eligibility to adults determined by Social Security to be disabled; once enrolled, they may lose disability status and stay enrolled. Enrollees must be employed with unearned income no higher than 150 percent of poverty and resources subject to limitations. There is no limit on earned income. Enrollees must pay fees based on their total countable income. Those with income above 150 percent of poverty pay an annual \$50 enrollment fee. Those with income above 200 percent of poverty pay a monthly premium, based on a sliding scale.

This report presents estimates of HCWD enrollment and costs under four different case mix scenarios, based on the experiences of other states that have already implemented similar Medicaid options.<sup>1</sup> Projections are made for the first five years of program growth. Findings are presented for individuals with total countable income at or below 150 percent of poverty, for those with countable income above the cut point, and for both groups together. Implications for program implementation are highlighted.

## Findings: Program Costs over Time

Among those with income at or below 150 percent of poverty (about 80% of all enrollees), best projections suggest that nearly 1,200 people will enroll in the first year of the program, with the number in this income range growing to 3,700 by year 5 (Exhibit ES1).<sup>2</sup> Among people with income above 150 percent of poverty, best

projections suggest that 200 will enroll in the first year of the program, with 700 enrolled by year 5. Beyond year 5, other states have experienced little program growth. Upper and lower bound estimates suggest total program enrollment could begin at 400 to 2,400 individuals in year 1 (projection: 1,400) and reach 2,700 to 6,200 (projection: 4,400) by year 5.

Best projections suggest that in program year 1, program costs for people with income at or below 150 percent of poverty will be about \$1.2 million, increasing to \$4.4 million in year 5 (Exhibit ES2).<sup>3</sup> Among people with income above 150 percent of poverty, best projections suggest program costs of about \$700 thousand in year 1, increasing to \$3 million in year 5. Costs for enrollees with incomes at or below 150 percent of poverty account for about 60 percent of program costs, this is because the majority would already have been enrolled in Medicaid prior to shifting to the buy-in. Upper and lower bound estimates suggest total program costs of \$1.9 million in the first year, with lower and upper bounds at \$600 thousand and \$3.3 million. By year five, total costs will be \$7.4 million with lower and upper bounds at \$4.5 and \$10 million.

## Implications

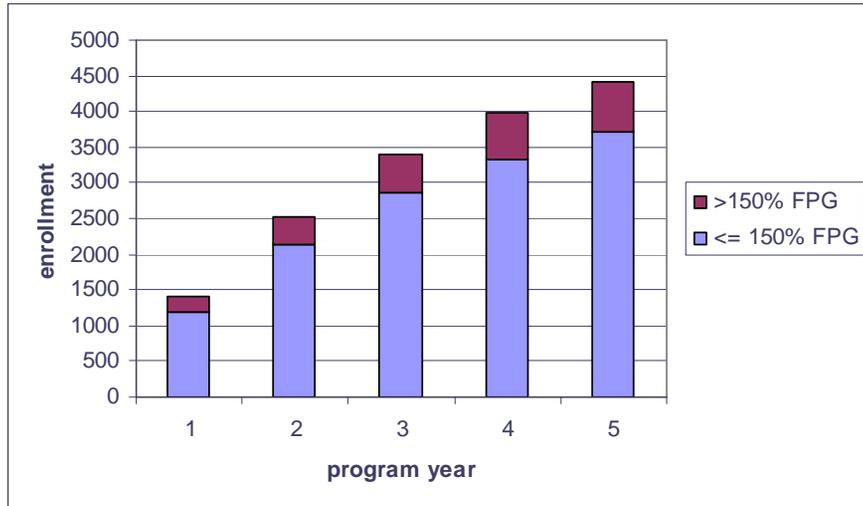
The North Carolina Division of Medical Assistance presently faces two challenges to implementing HCWD. First, it has been difficult for the Division to establish a long term contract for a new Medicaid management information system, and this is a critical tool for managing a new program. Second, the Division has not received funds to cover the costs of implementation. If, as a starting point, the Division opens HCWD to individuals with income at or below 150 percent of poverty, this will cover 80 percent of prospective enrollees and postpone the necessity of developing a protocol through MMIS for collecting administrative fees and monthly premiums.

<sup>1</sup> Details and references available in Thomas K, Ellis A, McConville R & Morrissey J (2008). Projecting the Cost of Health Coverage for Workers with Disabilities A new Medicaid program in North Carolina, Chapel Hill, NC: Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill

<sup>2</sup> Best estimates of enrollment were derived from mean enrollment in other states' Medicaid Buy-in programs by program year. Lower and upper bounds were derived from variation in enrollment across state programs.

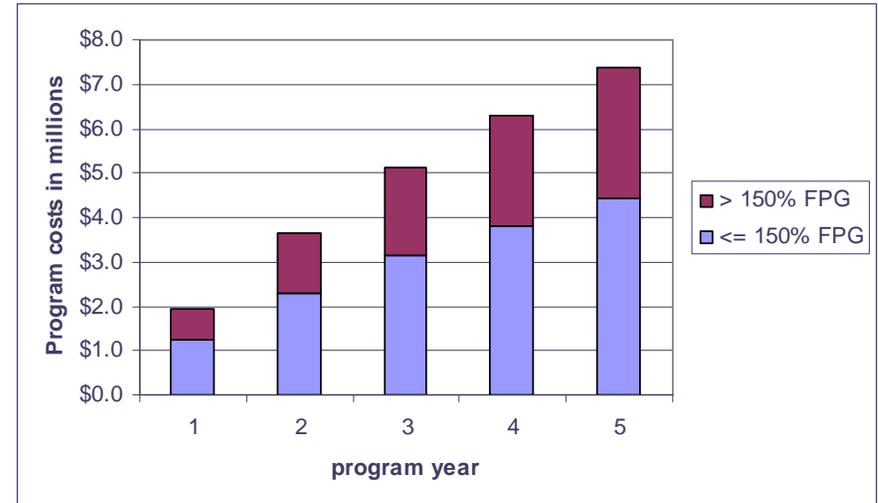
<sup>3</sup> Costs represent non-federal share of claims new to DMA (accounting for prior Medicaid enrollment) net applicable fees. Costs were derived from North Carolina Medicaid claims expenditures under different case mix scenarios. Best projections reported are derived from a case mix of SSI recipients 50 percent of whom have mental illness.

**Exhibit ES1. HCWD Projected Enrollment by Program Year and Income as a Percent of Poverty**



Best projections of enrollment were derived from mean enrollment in other states' Medicaid buy-in programs (n=34) by program year.

**Exhibit ES2. HCWD Projected Costs by Program Year and Income as a Percent of Poverty**



Costs represent non-federal share of claims new to DMA (accounting for prior Medicaid enrollment) net applicable fees. Costs were derived from 2007 North Carolina Medicaid claims (n=186,364 individuals); expenditures were adjusted for annual inflation. Exhibit shows projections derived from a case mix of SSDI recipients 50 percent of whom have mental illness.

**Health Coverage for Workers with Disabilities**

The Ticket To Work and Work Incentives Improvement Act gives states the option to expand Medicaid to cover working adults with disabilities with earnings above the typical threshold, called a buy-in option. North Carolina passed legislation to implement Health Coverage for Workers with Disabilities (HCWD) in response to this opportunity (NC Session Law 2005-276). HCWD extends full Medicaid eligibility to adults determined by Social Security to be disabled; once enrolled, they may lose disability status and stay enrolled. Enrollees must be employed with unearned income no higher than 150 percent of poverty and resources subject to limitations. There is no limit on earned income. Enrollees must pay fees based on their total countable income. Those with income above 150 percent of poverty pay an annual \$50 enrollment fee. Those with income above 200 percent of poverty must pay a monthly premium, based on a sliding scale.

This report presents projections of HCWD program enrollment, cost sharing and costs, based on a synthesis of analyses from North Carolina Medicaid claims and information from other states that have already implemented similar Medicaid options.<sup>4</sup> Projections are made for the first five years of program growth. Findings are presented for individuals with total countable income at or below 150 percent of poverty, for those with countable income above the cut point, and for both groups together. Implications for program implementation are highlighted.

**Projecting Costs for a New Program**

The projected costs are limited to Medicaid claims expenditures and represent costs that are new to the Division of Medical Assistance (DMA). That is, if a person was enrolled in Medicaid based on standard disability eligibility and then shifted to HCWD without changing the level of his or her expenditures, that person's care would generate no new costs to Medicaid

<sup>4</sup> Further details about the methods and results are available in Thomas K, Ellis A, McConville R & Morrissey J (2008) 'Projecting the Cost of Health Coverage for Workers with Disabilities A new Medicaid program in North Carolina: Technical Appendix' Chapel Hill, NC: Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

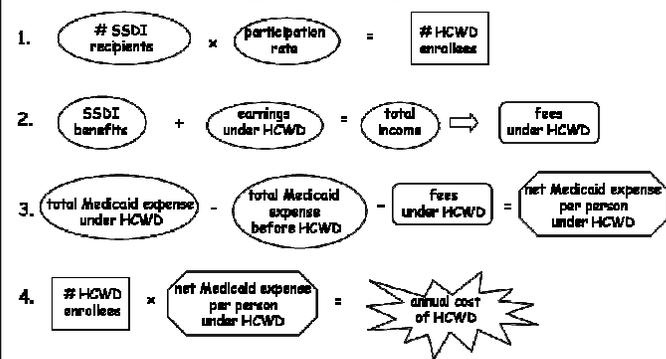
**Highlights**

- North Carolina has legislated a new Medicaid program, Health Coverage for Workers with Disabilities (HCWD), that will allow working adults with disabilities to keep Medicaid coverage as their earnings rise
- 1,400 people are expected to enroll in the first year, rising to 4,400 over time
- Over 80% of enrollees are expected to have income below 150% of poverty
- For enrollees who pay premiums, nonfederal costs will be offset by up to 11%
- HCWD will cost the state about \$1.9 million in the first year, rising to \$7.4 million over time
- Costs for enrollees with income below 150% of poverty represent about 60% of total program costs

and therefore would not affect the projections.

The report builds cost projections based on enrollment, cost-sharing and Medicaid expenditures (Exhibit 1). Data sources include North Carolina Medicaid claims and multiple-state data on Medicaid buy-in programs and social security recipients. Enrollment is projected using program participation rates from other states expressed as a percentage of the state's SSDI (Social Security Disability Insurance) population. Income is estimated from unearned income among SSDI recipients in North Carolina and their expected earnings under HCWD, then fees are calculated based on total countable income.<sup>5</sup> Costs are built as the claims costs under HCWD less any claims that would have been paid without the program in place and less fees. Each element is projected for five years.

**Exhibit 1. Building Cost Projections**



<sup>5</sup> Total countable income refers to the protocol established by the Social Security Administration to count income and establish program eligibility, described in the 2008 Red Book, <http://www.socialsecurity.gov/redbook/>. All further references to income in this report refer to total countable income.



### How many people will enroll in HCWD?

Among those with income at or below 150 percent of poverty (about 80% of all enrollees), best projections suggest that nearly 1,200 people will enroll in the first year of the program, with the number in this income range growing to 3,700 by year 5 (Exhibit 1). Among people with income above 150 percent of poverty, best projections suggest that 200 will enroll in the first year of the program, with 700 enrolled by year 5. Beyond year 5, other states have experienced little program growth.

The level of confidence in these projections decreases over time due to the small number of states with long-running programs: only 15 states have programs that are at least 6 years old. Exhibit 2 shows mean enrollment across state buy-in programs expressed as the rate of participation among state SSDI recipients with 95 percent confidence. These confidence limits suggest that, in North Carolina, total program enrollment could begin at 400 to 2,400 individuals in year 1 (projection: 1,400) and reach 2,700 to 6,200 (projection: 4,400) by year 5.

Enrollment was projected from counts of annual enrollment across state Medicaid buy-in programs, adjusted to reflect mean enrollment per month. The first step was to project a program participation rate. Because the total number of eligible people for each state's program is unknown, the size of each state's SSDI population was used as a common denominator (i.e., enrollment counts were standardized by dividing by the size of the state's SSDI population). This method yielded a mean participation rate and 95 percent confidence limits by program year. These rates were used to generate best projection and upper and lower bound projections of enrollment for North Carolina.

### Who will pay fees and how much?

Estimates indicate that 84 percent of enrollees will have total countable income at or below 150 percent of poverty and will pay no fees. Only 3 percent of enrollees will have incomes between 150 and 200 percent of poverty: this group must pay only the \$50 annual fee. Thirteen percent of

enrollees will have incomes above 200 percent of poverty and must pay monthly premiums in addition to the enrollment fee. Best projections suggest that 180 people will pay premiums in the first year of the program, with upper and lower bound projections between 60 and 300 people (Exhibit 3). By program year 5, nearly 580 people will pay premiums, with upper and lower bound projections between 350 and 800.

The total volume in premiums in the first year will be \$210 thousand with upper and lower bound estimates at \$60 and \$360 thousand (Exhibit 4). By program year five, estimates suggest these will rise to \$650 thousand, with lower and upper bounds of \$400 and \$900 thousand. Premiums will off-set non-federal program costs for enrollees who pay premiums by 7 to 11 percent over the first five years of the program.

Premiums were projected from a simulation model of HCWD enrollment. Enrollment was projected from state buy-in participation rates as described in the previous section. Total countable income was developed from SSDI benefit amounts and states' experiences with buy-in enrollee earnings. Premium amounts were calculated according to a sliding fee scale stipulated in the Ticket To Work legislation.

### What will HCWD cost?

Best projections suggest that in program year 1, program costs for people with income at or below 150 percent of poverty will be about \$1.2 million, increasing to \$4.4 million in year 5 (Exhibit 5).<sup>6</sup> Among people with income above 150 percent of poverty, best projections suggest program costs of about \$700 thousand in year 1, increasing to \$3 million in year 5. Costs for enrollees with incomes at or below 150 percent of poverty account for about 60 percent of program costs although this group represents about 80 percent of enrollees because the

<sup>6</sup> Costs represent non-federal share of claims new to DMA (accounting for prior Medicaid enrollment) net applicable fees. Costs were derived from North Carolina Medicaid claims per member per month expenditures under different case mix scenarios. Best projections reported are derived from a case mix of SSDI recipients 50 percent of whom have mental illness.



majority would already have been enrolled in Medicaid prior to shifting to the buy-in.

As with projected enrollment, the uncertainty in projected costs increases over time due to the small number of older buy-in programs across the U.S (Exhibit 6). Best projections suggest that total program costs will be \$1.9 million in the first year, with lower and upper bounds at \$600 thousand and \$3.3 million. By year five, total costs will be \$7.4 million with lower and upper bounds at \$4.5 and \$10 million.

Examination of different case mix scenarios of HCWD enrollees showed little impact except at the extreme (Exhibit 7). When expenditures were based on SSDI recipients, as a whole or with the population re-weighted to simulate higher participation rates among individuals with mental illness (either 50% or 75%), program costs remain similar. Costs rise from \$1.9 million in the first year to \$7.4 million in the fifth year. When expenditures were based on all disabled Medicaid recipients, program costs were higher, ranging from \$2.3 million in the first year to \$9 million in the fifth year.

Costs were derived from North Carolina Medicaid claims expenditures under different case mix scenarios to simulate possible variation. The four scenarios reflected enrollment by SSDI recipients, this group re-weighted so that 50% and 75% had mental illness, and all disabled recipients (n=186,364 individuals). SSDI recipients are more likely to participate than SSI recipients for two reasons. SSDI recipients have work experience which makes them more likely to be able to meet the program's work criteria. Also, when SSI recipients increase their earnings, they can keep their Medicaid coverage under section 1619(b) of the Social Security Act, so that they would not need HCWD until their earnings were quite high.

The projected costs represent the non-federal share of claims new to DMA (accounting for prior Medicaid enrollment) net applicable fees. First, individuals were categorized by level of countable income, enrollment was projected for each category, and applicable premium payments were calculated. Next, Medicaid

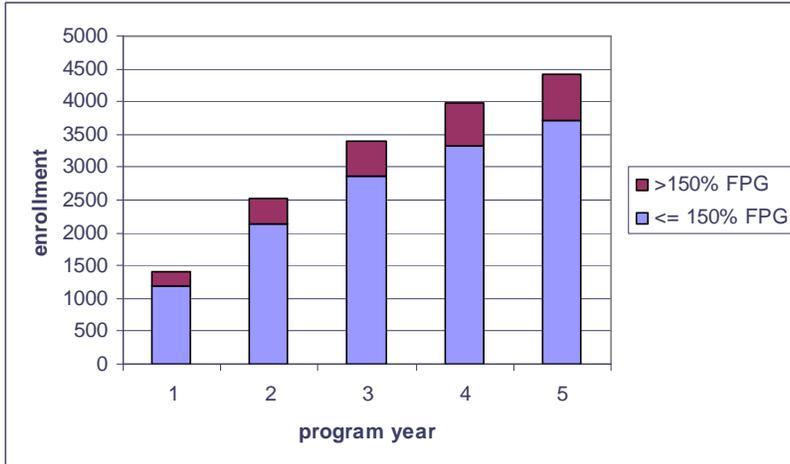
costs were determined, for the four case mix scenarios, before HCWD and after enrollment. Differences were due to new coverage for those not previously enrolled in Medicaid, increased coverage for people who previously had medically needy eligibility status, and premium payments. Costs new to DMA were deflated to determine the non-federal share for which the state would be responsible.

### Implications

The low program participation rates used to develop these findings underscore the difficulty other states have experienced in attempting to make their Medicaid buy-in programs a widespread tool that can support employment among adults with disabilities. In an effort to strengthen such programs, the Centers for Medicare and Medicaid Services provide Medicaid Infrastructure Grants to states to fund a range of efforts focused on increasing program participation in work support initiatives. North Carolina is the recipient of one of these awards.

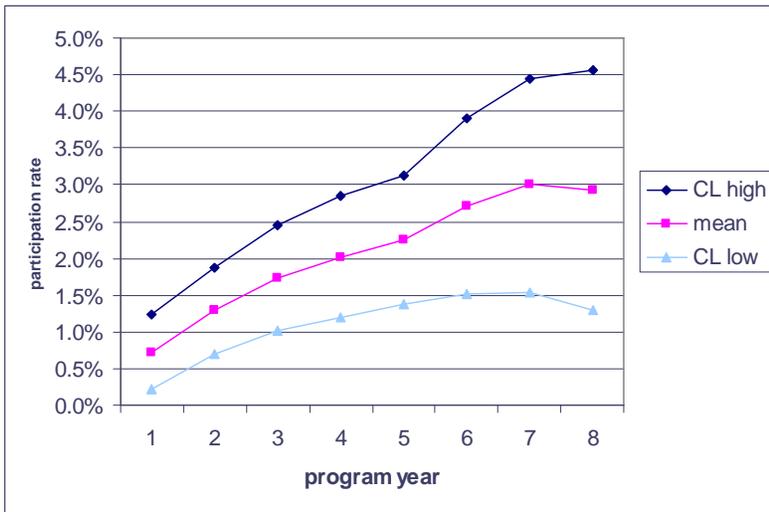
Despite the expectation of low program participation, the North Carolina Division of Medical Assistance presently faces two challenges to implementing HCWD. First, it has been difficult for the Division to establish a long term contract for a new Medicaid management information system, and this is a critical tool for managing a new program. Second, the Division has not received funds to cover the costs of implementation. If, as a starting point, the Division opens HCWD to individuals with income at or below 150 percent of poverty, this will cover 80 percent of prospective enrollees and postpone the necessity of developing a protocol through MMIS for collecting administrative fees and monthly premiums.

**Exhibit 1. HCWD Projected Enrollment by Program Year and Income as a Percent of Poverty**



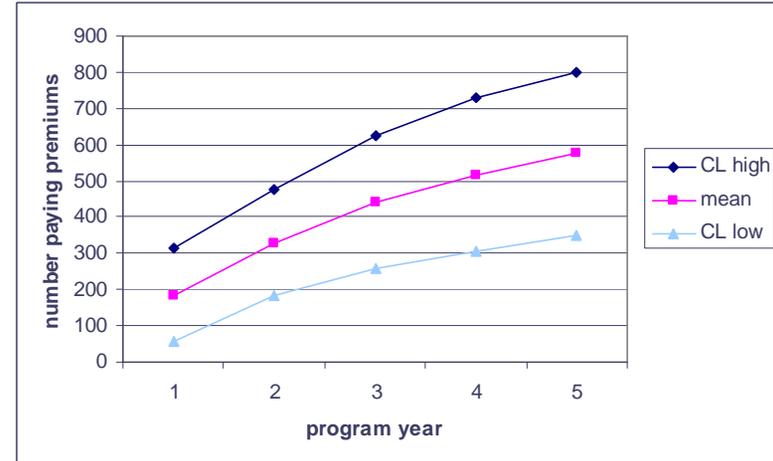
Best projections of enrollment were derived from mean enrollment in other states' Medicaid buy-in programs (n=34) by program year.

**Exhibit 2. HCWD Participation Rate and 95% Confidence Limits by Program Year**



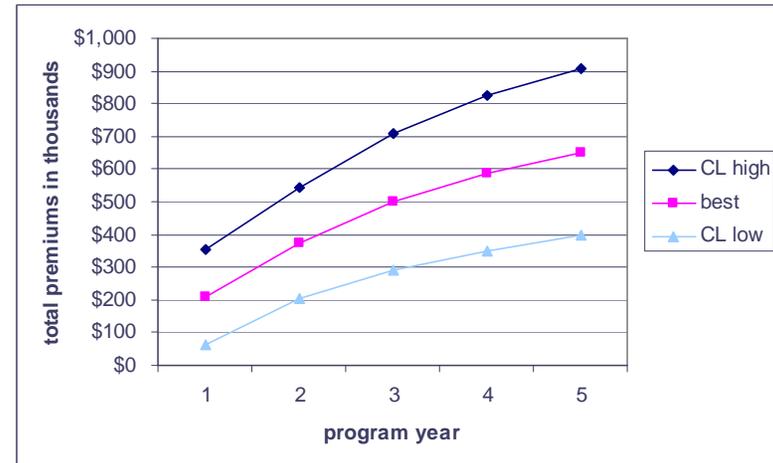
Mean participation rates (calculated as enrollment as a percent of state SSDI population) across state buy-in programs (n=32).

**Exhibit 3. Number of Enrollees Paying Premiums and 95% Confidence Limits by Program Year**



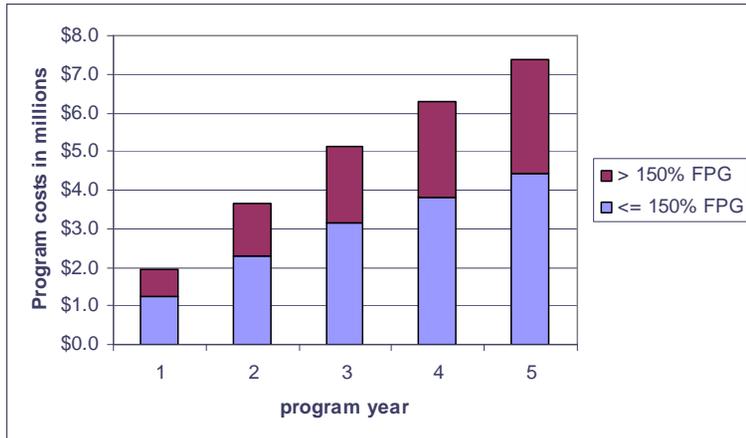
Confidence limits based on variation in total enrollment across other states.

**Exhibit 4. Total premiums and 95% Confidence Limits by Program Year**



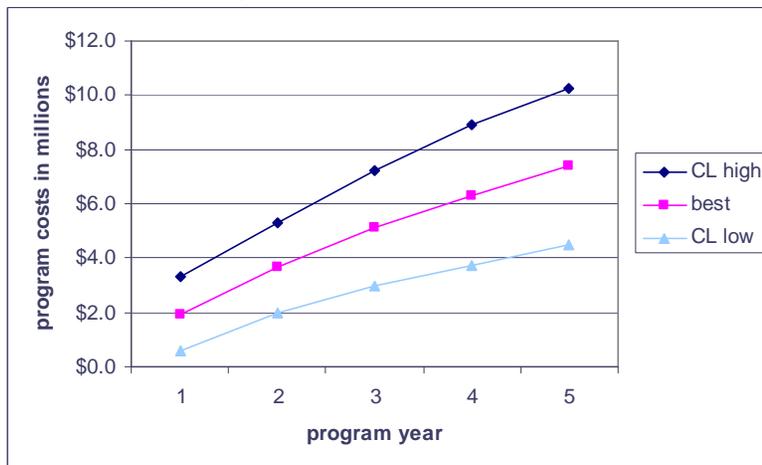
Individual enrollee premiums based on income projections. Confidence limits based on degree of variation in other states' enrollment experience.

**Exhibit 5. HCWD Projected Costs by Program Year and Income as a Percent of Poverty**



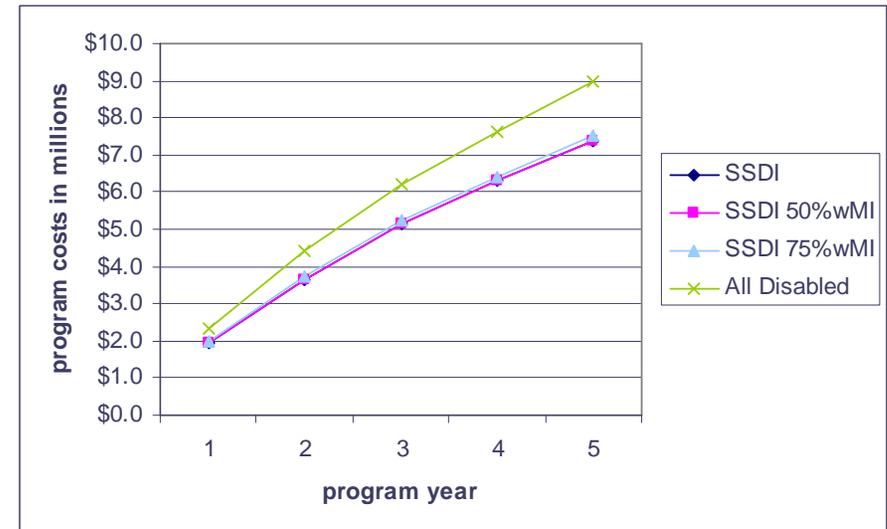
Costs represent non-federal share of claims new to DMA (accounting for prior Medicaid enrollment) net applicable fees. Costs were derived from 2007 North Carolina Medicaid claims (n=186,364 individuals); expenditures were adjusted for annual inflation. Exhibit shows projections derived from a case mix of SSDI recipients 50 percent of whom have mental illness.

**Exhibit 6. HCWD Projected Costs and 95% Confidence Limits by Program Year**



See note for Exhibit 5.

**Exhibit 7. HCWD Projected Costs by Case Mix Scenario and Program Year**



Costs were derived under 4 case mix scenarios: first, based on SSDI recipients (n=108,213 individuals); then with the SSDI sample re-weighted so that 50% and 75% had mental illness; and finally, all disabled recipients in 2007 North Carolina Medicaid claims (n=186,364 individuals).



## Overview

This Technical Appendix is a companion document to the report, *Projecting the Cost of Health Coverage for Workers with Disabilities: A New Medicaid program in North Carolina*. The report presents projections of enrollment, premiums and costs for Health Coverage for Workers with Disabilities (HCWD) over the first five years of implementation, based on other states' experiences with Medicaid buy-in programs and on North Carolina Medicaid claims expenditures. This Appendix presents detailed information about the methodology used to generate these projections and the rationale for various decisions. Variations from earlier projections, based on 2002-2004 Medicaid claims are also discussed (Thomas & Ellis, 2006; Thomas & Ellis, 2007).

## Enrollment

It would be ideal to measure Medicaid buy-in program enrollment across state programs as the mean number of people enrolled per month over the course of a year. This measure would represent best the Medicaid program's responsibility for covered lives because it would reflect individual disenrollments that occur during the year as well as seasonal variation in enrollment. Instead, the best data available count the number of people ever enrolled in a state buy-in over the course of the calendar year (Gimm, Davis, Adreus, et al., 2008). This is higher than a per-month average because people disenroll. Older data provide counts in a quarter (Black & Ireys, 2006). This narrower time frame does a better job of capturing mean enrollment, but does not reflect variation in enrollment over the course of a year. The older data also have a number of flaws, such as missing states, missing years, and apparent inconsistencies in data definitions between and within some states.

In order to make use of all available information, we compared annual and quarterly data to develop a deflation factor to apply to the annual data so that it approximates mean quarterly enrollment. After removing outliers with problematic data from the quarterly counts and those with very low enrollment that drops from rounding, the quarterly counts are, on average,

69 percent of the annual counts. This number is consistent across states with varying sizes of programs, and across calendar years. Program enrollment is measured as annual enrollment deflated 69 percent to reflect quarterly enrollment, the best measure available of the mean monthly number of covered lives.

We measure the participation rate by expressing enrollment as a percentage of the state's SSDI population (Social Security Administration, 2005). Because the total number of eligible people for each state's program is unknown, the size of each state's SSDI population was used as a common denominator (i.e., enrollment counts were standardized by dividing by the size of the state's SSDI population). Rates from Iowa and Missouri were removed because their buy-ins were developed and implemented under very different circumstances from North Carolina: removal reduced the standard deviation of the mean rate by one half to one third. Rates lower than 0.01 percent were also dropped because they were based on enrollment numbers that we felt did not reflect a full year of program implementation.

Social Security data indicate that there are 249,410 adults in North Carolina who are 18 to 64 years of age and receive SSDI benefits (Social Security Administration, 2005). Since HCWD enrollment is restricted to individuals with unearned income below 150 percent of the Federal Poverty Guideline (currently \$1,300 per month for a single individual), people with SSDI benefits above \$1300 per month are ineligible (US Department of Health and Human Services, 2008). This leaves a total of 196,535 SSDI recipients potentially eligible for HCWD.

In order to develop some confidence limits around our estimates, we treat states with existing buy-in programs as a random sample drawn from the full population of states. This allows us to predict North Carolina's likely participation rate from the population mean. Then we generate 95 percent confidence limits around that mean to give some upper and lower bounds to our estimates. To the extent that early buy-in states are different from late buy-in states, our estimates may be biased. We expect



that early buy-in states might be better positioned to implement a buy-in and ramp up enrollment. If this is true, our estimates will be biased upward.

Exhibit 2 of the report plots mean participation rates across active buy-in programs by program year. Upper and lower lines represent 95 percent confidence limits around the mean. As suggested by earlier findings, program growth rises in early years, then flattens out (Liu & Ireys, 2006). The mean participation rate was 0.7 percent in program year 1, reaching 2.3 percent by program year 5 and flattening out by year 7 at 3 percent. The confidence limits widen for later program years reflecting greater uncertainty about the mean participation rate, due to the smaller number of states with programs functioning that long. Table 1, at the end of this Technical Appendix, shows best estimates and lower and upper bound estimates for enrollment by program year, by income, and totals.

Earlier cost projections were based on mean participation rates across states, grouped by various program characteristics (Thomas & Ellis, 2006; Thomas & Ellis, 2007). At that time, there were too few active programs to calculate mean rates by program year. Program growth was estimated based on reported trends (Liu & Ireys, 2006). Current projections are based on newer and more extensive data, but the projected enrollment numbers are similar. Earlier estimates were also based on Social Security data from 2003, when fewer people were receiving SSDI benefits. This will result in greater projected costs.

### Premiums

Tables from the Social Security Administration (2005) describe the distribution of SSDI recipients by cash benefit level (e.g., there are about 40,000 SSDI recipients in North Carolina with cash benefits under \$600 per month, there are about 30,000 SSDI recipients with cash benefits between \$600 and \$700 per month, etc.). This information was used to assign an unearned income to each hypothetical HCWD enrollee.

Next, an earned income was assigned to each hypothetical HCWD enrollee. As part of their reporting requirements to CMS, buy-in states report enrollees' earnings from data collected through state unemployment insurance (UI) systems. Mathematica published the distribution of earnings of buy-in enrollees from 19 states (e.g. 18 percent of buy-in enrollees had earnings of \$300 or less per month, 17 percent had earnings between \$201 and \$400 per month, etc.; White, Black & Ireys, 2005).

Conceptually, this distribution of national enrollee earnings was 'overlaid' across the SSDI unearned income distribution to characterize the total earnings of each hypothetical HCWD enrollee. Specifically, the lowest earnings were assigned to individuals with the lowest SSDI cash benefits (so, working with the midpoints of the benefits/earnings categories, those who received \$200 in SSDI benefits were assigned monthly earnings of \$100), and then higher earnings were assigned to those with higher SSDI cash benefits. In this way, it was assumed that earnings history (reflected in the level of the SSDI cash benefit) was a good predictor of earnings level under HCWD.

Total earnings for an individual were estimated as the sum of the midpoints of the published SSDI benefit range and the buy-in enrollee earnings range. HCWD limits unearned income (as described above under enrollment) but not earned income. We do not have any information about the earnings of North Carolina SSDI recipients, so we assume that potential enrollees have no earnings pre-buy-in. If this assumption is incorrect, we know at least that their earnings are typically very low and must be below \$940 per month (the substantial gainful activity eligibility limit, Social Security Administration, 2008) and therefore unlikely to have an important impact on any fees they might have to pay under the buy-in.

The Bureau of Labor Statistics has estimated that UI data capture about 95 percent of the wage and salary component of personal income. However, the UI data exclude some workers who may be more prevalent among buy-in enrollees, particularly those who are self-



employed. Among the few buy-in states with additional data on self-employment earnings, 9.5 percent of buy-in enrollees had income from self-employment (White, Black & Ireys, 2005). Individuals who are self-employed earn less on average than others for a number of reasons: business ventures are not always successful; when they are, overhead can be large relative to profits; and the volume of hours worked is often small. Because UI data exclude this group, UI earnings may overstate average earnings for buy-in enrollees (White, Black & Ireys, 2005). This could overstate the impact of fees on state costs.

Monthly fees accruing to Medicaid under HCWD were calculated according to the fee schedule proposed for HCWD, based on total countable income.

Total countable income =  
 $1/2(\text{earned-65}) + \text{unearned-20}$

The schedule omits the \$50 annual enrollment fee that is charged once income reaches 150 percent of the federal poverty level because this part of the fee will cover administrative costs incurred by the Department of Social Services and will not defray costs to Medicaid. Here, the premium refers to the average cost of care to Medicaid.

Under 200% FPG (<\$19,139): no fee  
200%-249% FPG (\$19,140 - \$23,924): 5% of income  
250-449% FPG (\$23,925 - \$43,064): lower of 7.5% of income or 100% of premium  
450% FPG or above (\$43,065 or above): 100% of premium

Although this fee schedule includes all levels of earnings, the estimated levels of total income were low enough that the fee never shifted to a premium-based fee for the hypothetical HCWD enrollees. Earnings levels among buy-in enrollees drop sharply above the substantial gainful activity limit, suggesting a reluctance to jeopardize their disability status under Social Security (White, Black & Ireys, 2005). The low earnings levels indicate that, although the UI earnings distribution may overstate to some

degree the earnings of buy-in enrollees and thus the fees that they will pay, the overall projected size of these fees remained small.

Earlier cost projections were based on 2003 Social Security data where cash benefits were lower, so total income is higher in the current projections (Thomas & Ellis, 2006). This will decrease projected state costs. Also, the earlier projections based fees on total rather than total countable income. This will reduce projected fee receipts and increase projected state costs.

### Costs

We used state fiscal year (SFY) 2007 North Carolina Medicaid claims to estimate base costs to use in the cost projection model. The population was composed of 186,364 enrollees with SFY 2007 claims who received SSI or SSDI sometime during SFY 2002-2007 but did not have any SFY 2007 claims for nursing facility, intermediate care facility, group home, or long term care services and were not aliens (individuals without US citizenship) during SFY 2007. The service-based exclusions were made because individuals receiving those services have significantly higher costs and were considered unlikely to be able to meet the work criteria of the program. Aliens (individuals without US citizenship) were excluded because an important portion of them have limited coverage under Medicaid so that their claims do not reflect the full cost of their care, and because that same group would not be eligible for HCWD.

**The Claims Population:** We felt it was important to include people with medically needy eligibility status in the claims population because we expect HCWD to be particularly attractive to this group. Medically needy people were included without adjustment in the population used to project annual expenditures. We made this decision after close analysis of their impact.

We were concerned that since the full expenditures of the medically needy group are not be reflected in their claims, their expenses would be underestimated and thereby artificially lower mean annual expenditures. We considered increasing their projected



expenditures by the minimum possible spend-down amount, but because old bills and bills not covered by Medicaid can be applied to spend down, we felt we did not have enough information to create a valid inflation factor. Ultimately, we corrected for gaps in their claims by annualizing expenditures (described below).

Contrary to expectations, preliminary analyses (prior to annualizing) indicated that the medically needy group actually has higher mean annual Medicaid expenditures than does the categorically needy group (\$12,000 vs \$9,000 in fiscal year 2007). Given the process of obtaining medically needy status, it is also possible that their expenditures may be over estimated. An adult can gain Medicaid eligibility through the medically needy group if they meet disability requirements and incur a minimum of \$3,756 in medical costs over six months. Typically, a large hospital bill opens the door to medically needy eligibility, so we know that the people who are in the medically needy group have had low medical expenses followed by a large bill. This suggests that their claims contain expenditures that are high compared to their expenses in years prior to attaining medically needy status. Since we adjust for underestimation but have no way of doing so for overestimation, we have some confidence that including the medically needy group in the claims population is at least a conservative approach that may yield higher enrollee costs than might actually be experienced.

We annualized expenditures of individuals to reflect the expectation that HCWD enrollees are much more likely to stay enrolled over the course of a year than they would have been before HCWD implementation. Expenditures were annualized by imputing the mean expenditure of the individual over the enrolled months to those months when the person was not enrolled. We calculated annual per person expenditures as the sum of all annualized expenditures from the target group, divided by the number in the group. Mean annualized expenditures in fiscal year 2007 are \$21,642 (80.4 percent over actual) for the medically needy group compared to \$10,110 (8.8 percent over actual) for those categorically eligible.

Individuals who are categorically eligible are eligible 11 months per year on average. Individuals who are medically needy are eligible 7 months per year on average ( $n=5,639$ ;  $5,639/186,364=3\%$  of the population).

**Case Mix Scenarios:** The claims data were the basis for projections of annualized expenditures under different assumptions about buy-in enrollee characteristics. Four case mix scenarios were considered (Table 1 presents costs by each of the four case mix scenarios). First, expenditures were determined for SSDI recipients because these individuals have a history of work and are expected to be most able to meet the employment criteria of HCWD. The annualized mean expenditures per member per month for enrollees who receive SSDI was \$676. This estimate is based on a group that excludes individuals who are Medicaid-eligible based solely on SSI or 1619(b) status. These individuals do not have the work experience of the SSDI group. The SSDI group represents the lowest-cost group under consideration. Second, expenditures were determined assuming that HCWD would be particularly attractive to individuals with mental illness. Other states' experience with buy-in enrollment suggests that HCWD may be more attractive to individuals with mental illness, so that they are disproportionately represented among buy-in participants (Liu, Ireys, White & Black, 2004; Salley, & Glantz, 2002). In the population of North Carolina Medicaid enrollees with disabilities, 43 percent have mental illness. Annualized mean individual expenditures in this group were \$8,551 per year, over \$800 higher than expenditures for those without mental illness. We re-weighted the SSDI sample under two case mix scenarios. First, we assumed that half of those enrollees had mental illness, yielding mean per member per month expenditures of \$678. Next, we assumed that 75 percent of SSDI enrollees had mental illness, yielding mean per member per month expenditures of \$695.

Finally, expenditures were determined for all 186,364 individuals with any disability. If HCWD is attractive to a wide range of individuals, and successful in facilitating a wide range of work



opportunities that SSI recipients may take advantage of, this may be the best estimate of cost. We consider this the upper bound of base cost possibilities. The mean per member per month expenditure for all individuals with disabilities is \$872.

In earlier projections, expenditures were inflated 15 percent (Thomas & Ellis, 2006), consistent with early findings from other buy-in states where expenditures for buy-in enrollees were 15 percent higher than expenditures for other blind and disabled Medicaid recipients (White et al., 2005). New findings from Mathematica, using 2000 data, indicate that buy-in enrollees' expenditures were 40 percent lower than those of other Medicaid enrollees with disabilities (Schimmel, Irvin and Liu, 2007). This is largely driven by dual Medicare coverage, which was held by 79 percent of buy-in enrollees compared to 51 percent of other enrollees with disabilities. We capture this pattern by generating costs for the SSDI group. In our data, their annual expenditures (\$8,115) are 22 percent lower than those of the total group (\$10,459) and 41 percent lower than those of the non-SSDI group (\$13,705). In this version, we omit the 15 percent inflation of costs.

We also redefined potential enrollment groups to focus on those who receive SSDI. In previous analyses, the groups re-weighted for mental illness were derived from the entire sample rather than the SSDI group. The current cost projections derived from the SSDI group are similar to the earlier low-end estimates, while the current projections derived from the whole disabled population are similar to the earlier high-end estimates.

**Defining Disabilities:** For the case mix scenarios with higher proportions of individuals with mental illness, we determined diagnosis using ICD-9 codes rather than the Chronic Disability Payment System (CDPS; Kronick, Gilmer, Dreyfus et al., 2000) used for earlier projections. We feel that the current method captures everyone with a mental illness diagnosis, whereas the algorithm for the CDPS is not as transparent. Mathematica (Schimmel, Irvin & Liu, 2007) uses the CDPS to define

disability and notes that 60 percent of buy-in participants had psychiatric disability. We constructed enrollee groups with 50 percent and 75 percent to bracket their finding.

We classified autism as a mental illness for two reasons. First, it would be reasonable to expect that it was counted this way by other states when reporting on people with mental illness in their buy-ins. Second, we expect that including people with autism will raise mean expenditures for the group with mental illness. We feel it is conservative to define the mental illness group to include high cost autism people because we over-weight the participant sample to reflect higher use by people with mental illness, which will lead to higher cost projections. Including autism as a mental illness adds 1,360 individuals, raising the proportion of disabled Medicaid recipients with mental illness from 42.0 percent to 42.5 percent.

We were concerned that some people with minor or short-term mental health problems, rather than severe mental illness, might be erroneously included in the mental illness group. Therefore we considered using only primary and secondary (as opposed to later) diagnoses in each claim to identify mental illness. However, instead of relying on the ranking of importance of the diagnosis for a given claim, we decided to base status on having a severe mental illness coded in any diagnosis field (we have 4 in our data) and narrowed the qualifying set of diagnoses to the following: schizophrenic disorders, affective psychoses, paranoid states, other nonorganic psychoses, autism, neurotic disorders, personality disorders, and conduct disturbance. Even if these diagnoses were not the primary reason for a given claim, they are a standard set that reflects severe mental illness likely to be associated with long-term disability.

**Cost Inflation:** Base SFY 2007 expenditures were inflated to reflect expected expenditures in each of the first five years of HCWD, beginning in fiscal year 2010. We received inflation factors from DMA that predict a constant rate of growth over fiscal years 2011 and 2012, which we extended through 2014. For the case mix scenario in which all enrollees are SSDI



recipients and 50 percent have mental illness, mean per member per month expenditures range from \$829 in program year 1 to \$1,085 in program year 5 (Table 1 presents costs by program year). We updated the state share of claims expenditures to 0.3465 from the 0.3637 used in our earlier projections. We hold this constant across all five years of cost projections. The inflation factor and the increase in the state share affect the cost projections in opposite directions (Thomas & Ellis, 2006; Thomas & Ellis, 2007).

### References

Black, W, H. Ireys (2006) Understanding Enrollment Trends and Participant Characteristics of the Medicaid Buy-In Program, 2003-2004, Mathematica Policy Research, ref no 8920-790.

Gimm, G, S. Davis, K Adrews, H Ireys, S Liu (2008) The Three E's: Enrollment, Employment, and Earnings in the Medicaid Buy-In Program, 2006, Mathematica Policy Research, Ref No 6170-330

[Kronick, R.](#), T. Gilmer, T. Dreyfus, and L. Lee (2000) Improving health-based payment for Medicaid beneficiaries: CDPS. Health Care Financing Review, 21(3):29-64.

Liu, S, and H. Ireys (2006) 'Participation in the Medicaid Buy-In Program: A Statistical Profile from Integrated Data,' Mathematica Policy Research, May.

Liu, S., H. Ireys, J. White, and W. Black (2004) "Enrollment Patterns and Medical Expenditures for Medicaid Buy-In Participants in Five States," Mathematica Policy Research, Ref No 8920-700, Washington, D.C.

Salley, S. and L. Glantz (2002) The MaineCare Option for workers with Disabilities: A Survey of Past and Present Enrollees *Institute for Health Policy, Muskie School*.

Schimmel, J, C. Irvin, and S. Liu (2007) Working with Disability, Medicaid Expenditures in Brief, Mathematica Policy Research, Number 5, June.

Social Security Administration (2005) Table 5.J8 Percentage distribution of disabled workers, by state or other area and monthly benefit, December 2005

Social Security Administration (2008) The 2008 Red Book,  
<http://www.socialsecurity.gov/redbook/>.

Thomas K, Ellis A (2006) 'Projecting the Cost of Health Coverage for Workers with Disabilities, A new Medicaid program in North Carolina: Who Will Enroll and How Much Will They Cost?' Chapel Hill, NC: Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

Thomas K, Ellis A (2007) 'Five-Year Cost Projections for NC Health Coverage for Workers with Disabilities' Chapel Hill, NC: Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

US Department of Health and Human Services (2008) Annual Update of the HHS Poverty Guidelines, Federal Register, 73(15): 3971-3972.

White, J., W. Black, and H. Ireys (2005) Explaining Enrollment Trends and Participant Characteristics of the Medicaid Buy-In Program, 2002-2003 *Mathematica Policy Research, Inc.* No. 8920-710, Washington, D.C.

**Table 1. HCWD Projected Costs by Income, Case Mix Scenario, Enrollment Estimates and Program Year**

Enrollment	Enrollees with Countable Income ≤ 150% FPL					Enrollees with Countable Income > 150% FPL					Total Enrollees				
	Total Enrolled	Case mix scenarios & Exp's per member per month				Total Enrolled	Case mix scenarios & Exp's per member per month				Total Enrolled	Case mix scenarios & Exp's per member per month			
		SSDI only	SSDI 50% w MI	SSDI 75% w MI	All Disabled		SSDI only	SSDI 50% w MI	SSDI 75% w MI	All Disabled		SSDI only	SSDI 50% w MI	SSDI 75% w MI	All Disabled
<b>FY2010</b>															
Best estimate	1189	\$1,231,128	\$1,232,290	\$1,247,382	\$1,399,847	226	\$706,692	\$708,241	\$728,364	\$931,650	1415	\$1,937,820	\$1,940,531	\$1,975,747	\$2,331,497
Lower bound	363	\$376,178	\$376,533	\$381,145	\$427,731	69	\$215,934	\$216,407	\$222,556	\$284,671	432	\$592,112	\$592,940	\$603,700	\$712,402
Upper bound	2031	\$2,103,177	\$2,105,162	\$2,130,945	\$2,391,405	387	\$1,207,265	\$1,209,911	\$1,244,289	\$1,591,569	2417	\$3,310,442	\$3,315,073	\$3,375,234	\$3,982,974
<b>FY2011</b>															
Best estimate	2130	\$2,278,664	\$2,280,891	\$2,309,815	\$2,602,003	406	\$1,363,347	\$1,366,315	\$1,404,880	\$1,794,464	2535	\$3,642,011	\$3,647,206	\$3,714,695	\$4,396,467
Lower bound	1172	\$1,254,148	\$1,255,374	\$1,271,293	\$1,432,110	223	\$750,369	\$752,003	\$773,229	\$987,651	1395	\$2,004,518	\$2,007,377	\$2,044,522	\$2,419,761
Upper bound	3087	\$3,303,180	\$3,306,407	\$3,348,336	\$3,771,895	588	\$1,976,324	\$1,980,628	\$2,036,532	\$2,601,278	3675	\$5,279,504	\$5,287,035	\$5,384,868	\$6,373,173
<b>FY2012</b>															
Best estimate	2856	\$3,160,446	\$3,163,640	\$3,205,131	\$3,624,267	544	\$1,967,782	\$1,972,040	\$2,027,361	\$2,586,210	3400	\$5,128,228	\$5,135,680	\$5,232,492	\$6,210,477
Lower bound	1667	\$1,845,116	\$1,846,981	\$1,871,203	\$2,115,902	318	\$1,148,820	\$1,151,307	\$1,183,604	\$1,509,868	1985	\$2,993,936	\$2,998,287	\$3,054,807	\$3,625,770
Upper bound	4028	\$4,457,508	\$4,462,013	\$4,520,531	\$5,111,683	767	\$2,775,368	\$2,781,374	\$2,859,399	\$3,647,602	4795	\$7,232,876	\$7,243,387	\$7,379,930	\$8,759,286
<b>FY2013</b>															
Best estimate	3335	\$3,820,825	\$3,824,814	\$3,876,634	\$4,400,111	635	\$2,471,765	\$2,477,084	\$2,546,177	\$3,244,146	3970	\$6,292,591	\$6,301,898	\$6,422,810	\$7,644,257
Lower bound	1981	\$2,269,797	\$2,272,167	\$2,302,951	\$2,613,927	377	\$1,468,376	\$1,471,535	\$1,512,580	\$1,927,216	2358	\$3,738,173	\$3,743,702	\$3,815,531	\$4,541,143
Upper bound	4705	\$5,390,768	\$5,396,396	\$5,469,508	\$6,208,077	896	\$3,487,392	\$3,494,896	\$3,592,378	\$4,577,137	5601	\$8,878,160	\$8,891,292	\$9,061,886	\$10,785,214
<b>FY2014</b>															
Best estimate	3715	\$4,411,462	\$4,416,215	\$4,477,954	\$5,101,640	708	\$2,960,661	\$2,966,998	\$3,049,317	\$3,880,898	4422	\$7,372,123	\$7,383,213	\$7,527,271	\$8,982,538
Lower bound	2262	\$2,686,090	\$2,688,984	\$2,726,577	\$3,106,332	431	\$1,802,714	\$1,806,572	\$1,856,695	\$2,363,036	2693	\$4,488,804	\$4,495,556	\$4,583,271	\$5,469,367
Upper bound	5167	\$6,136,834	\$6,143,446	\$6,229,332	\$7,096,948	984	\$4,118,608	\$4,127,423	\$4,241,938	\$5,398,760	6152	\$10,255,443	\$10,270,869	\$10,471,270	\$12,495,708