

Health and Human Services Commission



Don A. Gilbert, Commissioner

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Overview of Forecasting

- Forecasting in Health and Human Services (HHS) agencies typically focuses on projecting caseloads and costs for services in order to predict future budget needs.
- Forecasts show what will likely happen if past trends and empirical relationships continue.
- Forecasts are a qualified statement of the exact values of future caseloads and costs.
- Components of good forecasts include:
 - Accurate, historical data
 - Sophisticated statistical forecasting models
 - An understanding of the details of programs, their benefits, eligibility requirements, clients and target populations
 - Informed judgment

Role of HHSC in The Health and Human Services Agency Forecasting Process

- Coordinate, review and approve HHS agency caseload forecasts
- Convene quarterly interagency forecasting meetings to ensure consistency in trends among associated benefit programs and publish quarterly HHS agency caseload forecasts
- Provide technical assistance and consultation related to the forecasting process
- Direct interagency forecasting initiatives
- Produce caseload and cost forecasts for Medicaid and CHIP and for some programs at other agencies

Forecasting Approach of Health and Human Services Agencies

- Most HHS forecasts are based on time-series models, with appropriate adjustments for policy changes, demographic data or reimbursement rate changes.
- Time-series modeling is considered a state-of-the-art forecasting methodology with a demonstrated effectiveness that is widely used in government and the private sector.
 - Key HHS caseload forecasts based on time-series models include:
 - ▶ HHSC Medicaid caseloads
 - ▶ TDHS TANF, Food Stamps, Client Support Services Medical Assistance, and Long-Term Care caseloads
 - ▶ MHMR Mental Health Community Services caseloads
 - ▶ TDH WIC, HIV/STD Treatment and Prevention, and immunization caseloads
 - ▶ TRC Vocational Rehabilitation Program and Comprehensive Rehabilitation Services caseloads
 - ▶ ECI Comprehensive Services caseloads
 - ▶ PRS Child Abuse/Neglect Investigations, Foster Care, and Adoptions of Children in State Conservatorship caseloads

- Time-series models use historical values in a mathematical model to pattern historical data, such as monthly caseload or cost data, which will produce better forecasts than models that use data not directly tied to the variable being forecast.
- A variety of time-series models with differing characteristics are available for use.
- Time-series models weight recent trends more heavily, as caseload growth in the next 6-18 months is more likely to reflect current trends, not those going back a number of years.
- Several models are followed over time to determine which best depicts actual caseload change. The model that best predicts caseload change is usually watched more carefully, although several models continue to be followed, as data characteristics impacting model performance can rapidly change.
- Data required for health and human services time-series forecasting is usually available and accessible. The limitations of these data are known and well understood by the forecasters.

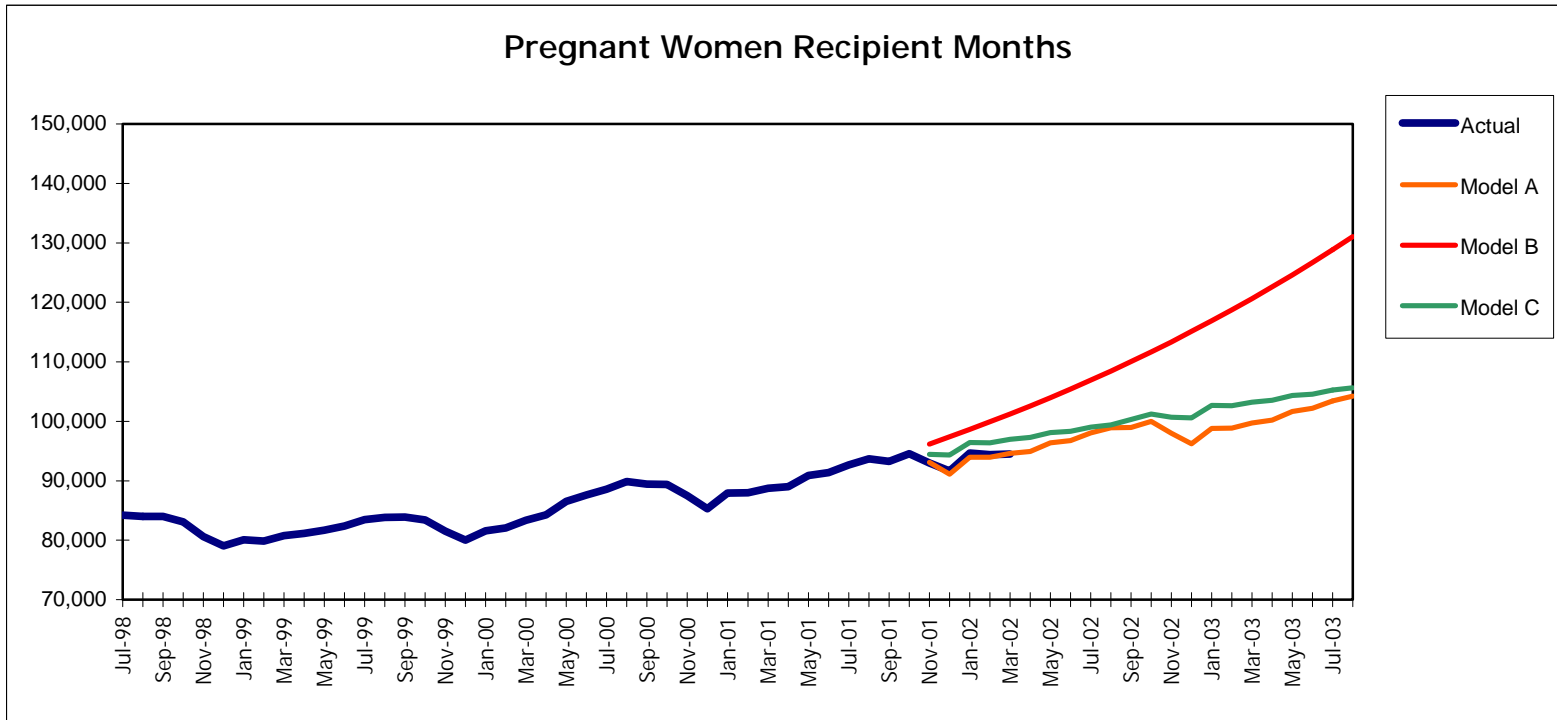
Acute Care Medicaid Forecasts

Overview of Forecasting Process

- Forecasts for most acute care Medicaid programs are for the number of clients served (recipient months*) and the average cost of services for those clients.
- Time-series models are used for caseload and most cost forecasts.
- A bottom-up approach to forecasting is used. That is, caseload and cost forecasts are produced at the risk group or service level and are then aggregated to produce strategy or total program forecasts.
- The raw data for clients comes from reports generated by DHS while cost data comes from various sources including reports of claims and vouchers paid at NHIC and paid pharmacy claims from DHS.
- Because the model that best describes the historical data is not always the best forecasting model, HHSC follows a collection of good-fitting models to determine which performs the best. The best-performing model is then used for the next period.
- Forecasts are updated monthly and recast quarterly to pick up the impact of change.

*A recipient month is defined as one month's coverage for an individual who has been determined as eligible for Medicaid services covered under the insured arrangement.

Example of Forecasting Models



- Model A utilizes more of the historical data than the other models, and it includes a component that accounts for historical seasonal fluctuations.
- Model B is a simple model that uses the most recent data, resulting in a continuation of the recent rising trend. It does not have a seasonal component.
- Model C is similar to Model B in the use of the most recent data. However, the difference is that Model C includes a seasonal component.

Factors Impacting HHSC Medicaid Time-Series Forecast Accuracy

- Anticipated policy changes, such as the simplification process for Medicaid eligibility, or changes in provider reimbursement rates are modeled separately and added to a time-series forecast. Using available eligibility and cost data, assumptions are made about the impact expected as a result of the policy change.
- Unanticipated policy changes can also affect the forecasts.
- Economic conditions are a factor for the poverty level populations in the Medicaid program. Changes in conditions can increase or decrease the potential client pool, but anticipating that turn has challenged the best economists.
- Time-series models are best used for short-term forecasts - - 6-18 months. The accuracy diminishes as the horizon increases.
- The schedule on the next page which compares the April 2001 LAR update forecast to the actual Medicaid caseload by risk group illustrates the points made above.

**Comparison of April 2001 LAR Update Forecast
and Actual Medicaid Caseload by Risk Group**

	Aged & Medicare		Disabled & Blind		TANF Children		TANF Adults		Pregnant Women		Newborns	
	April LAR update forecast	Actual	April LAR update forecast	Actual	April LAR update forecast	Actual	April LAR update forecast	Actual	April LAR update forecast	Actual	April LAR update forecast	Actual
Mar-01	310,437	309,562	206,245	207,099	347,881	341,096	107,575	104,802	89,616	88,747	115,674	115,214
Apr-01	310,622	309,489	206,693	208,126	343,211	339,824	105,582	104,474	90,581	88,985	115,385	114,657
May-01	311,060	309,283	207,143	207,997	347,757	341,235	107,418	105,302	93,043	90,899	116,648	115,612
Jun-01	311,277	308,841	207,594	207,592	350,581	342,415	107,948	105,981	91,553	91,367	117,048	115,980
Jul-01	311,667	309,126	208,045	208,721	352,131	346,719	108,336	107,840	92,558	92,650	115,617	117,095
Aug-01	312,494	309,079	208,498	208,474	355,436	352,595	109,606	109,815	93,928	93,685	117,231	117,864
Sep-01	314,020	309,143	207,624	209,574	356,856	356,370	109,832	110,958	95,032	93,250	119,821	117,271
Oct-01	314,041	310,181	207,249	210,193	358,282	362,446	110,058	113,631	94,648	94,545	119,999	118,746
Nov-01	313,723	310,435	207,682	209,687	359,714	364,983	110,285	114,162	91,128	92,989	119,092	117,923
Dec-01	312,680	309,642	208,147	210,639	361,152	366,644	110,512	114,678	89,350	91,657	120,537	118,745
Jan-02	313,538	312,174	208,237	211,323	362,595	369,318	110,739	116,360	91,614	94,672	120,837	119,911
Feb-02	313,197	312,138	209,197	212,570	364,045	369,071	110,967	115,830	91,386	94,364	118,820	119,138
Mar-02	312,931	312,900	209,646	212,550	365,500	370,450	111,195	115,830	91,855	94,516	119,258	120,389
MAPE (1)	0.74%		0.83%		1.41%		2.50%		1.65%		0.95%	

	Expansion Children		Federal Mandate		Medically Needy		CHIP I		Total Medicaid	
	April LAR update forecast	Actual	April LAR update forecast	Actual	April LAR update forecast	Actual	April LAR update forecast	Actual	April LAR update forecast	Actual
Mar-01	314,117	320,192	344,036	344,400	27,038	26,457	14,920	14,469	1,877,538	1,872,038
Apr-01	306,797	319,592	339,123	343,189	26,886	26,239	14,229	13,436	1,859,108	1,868,011
May-01	310,211	323,192	344,903	346,478	28,215	26,861	13,735	12,697	1,880,133	1,879,556
Jun-01	305,196	323,593	342,368	347,989	27,928	26,847	13,010	11,783	1,874,502	1,882,388
Jul-01	304,683	329,303	343,460	353,571	28,108	27,545	12,601	10,857	1,877,204	1,903,427
Aug-01	310,119	333,800	351,643	360,725	29,026	28,063	11,974	9,863	1,899,954	1,923,963
Sep-01	312,603	336,288	350,370	363,136	29,510	28,136	11,388	8,797	1,907,057	1,932,922
Oct-01	315,108	349,408	356,161	377,410	30,012	30,046	10,637	8,116	1,916,195	1,974,722
Nov-01	317,632	350,481	354,666	378,274	28,996	30,234	9,909	6,979	1,912,827	1,976,146
Dec-01	320,177	356,660	358,245	383,313	29,306	30,585	9,205	6,234	1,919,311	1,988,797
Jan-02	330,166	381,589	374,818	405,837	31,010	32,376	8,916	5,786	1,952,471	2,049,346
Feb-02	353,884	399,688	392,931	421,150	30,974	32,516	8,182	5,164	1,993,582	2,081,630
Mar-02	362,535	415,628	403,760	433,639	31,952	33,279	7,460	4,561	2,016,092	2,113,742
MAPE (1)	8.03%		3.99%		3.49%		30.10%		2.19%	

(1) Mean Absolute Percent Error tells the average amount of difference between a forecast value and the actual result.

Source: RMFC0301, RMFC200203

Note: SB43 estimates were added to the January 2002 April LAR update forecasts shown above.

Impact of Variation Between Forecast and Actual Experience

- Because acute care Medicaid caseloads and expenditures are so large, even the slightest variation has significant consequences for the budget.
- A caseload difference of 1,000 recipient months, which is equal to only .05 percent of the current monthly caseload, results in a \$1.0 million impact on annual General Revenue expenditures.
- A one percent variance between the forecasted and actual caseload is equal to about 20,000 recipient months or \$20.0 million in annual General Revenue expenditures.

Checks and Balances for Medicaid Forecasts

- HHSC contracts for second opinions about forecasts from the actuarial consulting firm of Rudd and Wisdom.
- The State Auditor's Office positively reviewed the forecasting methodology in 1991 and in 2001.
- Independent forecasts are produced and updated regularly by NHIC.
- Medicaid caseload and expenditure data and caseload and cost forecasts are submitted each month to the Legislative Budget Board (LBB) and to the Governor's Office.
- Acute care Medicaid caseload forecasts are subject to the same HHSC enterprise coordination, review and approval as other HHS agencies.

CHIP Forecasting

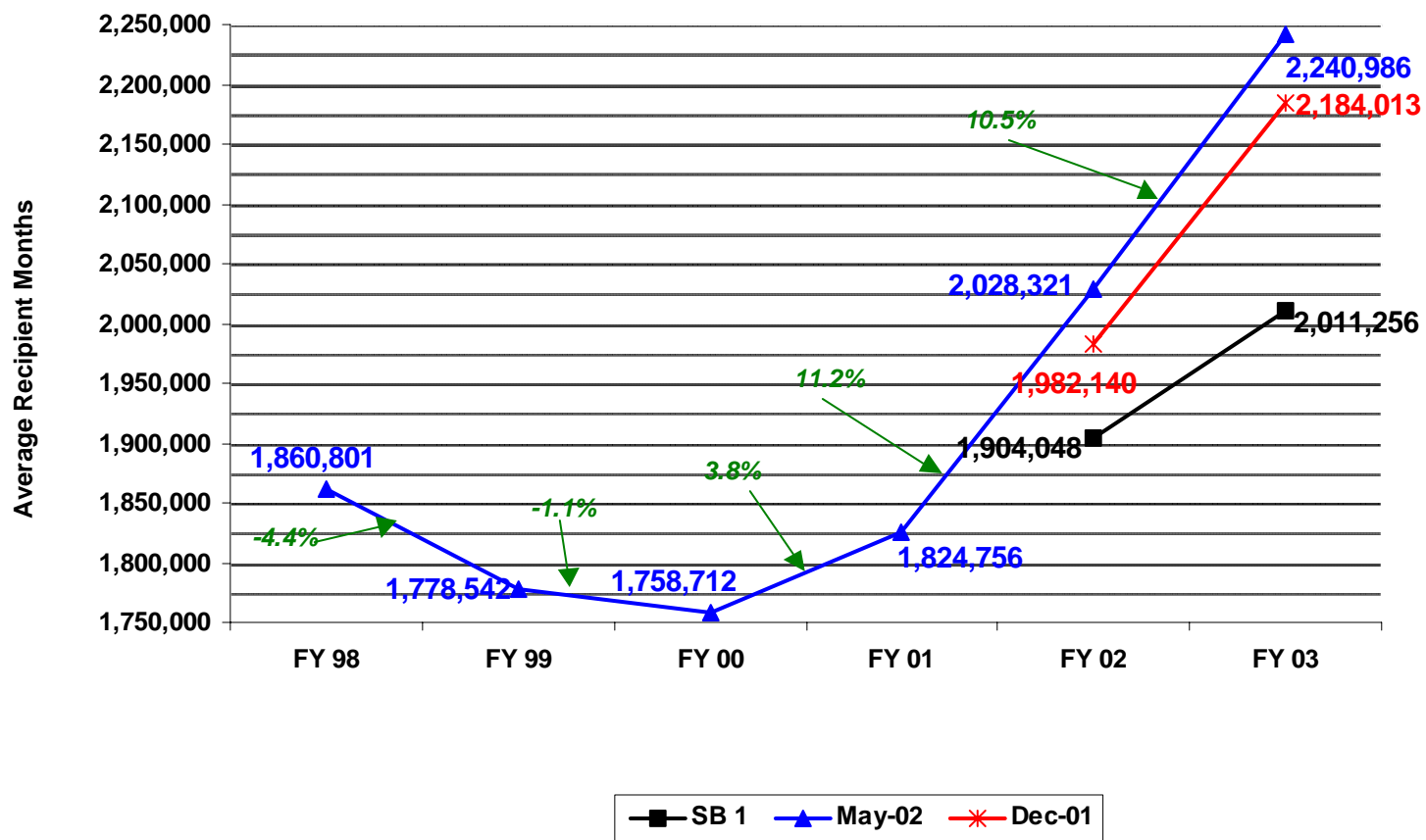
- Because CHIP is a new program, it lacks the historical data necessary for time-series forecasting.
- The CHIP caseload forecast is based on an estimate of the eligible population which includes estimates of:
 - The CHIP income-eligible, uninsured population
 - The Medicaid income-eligible uninsured population with assets that exceed the Medicaid asset limit
 - The number of CHIP and Medicaid income-eligible children who have had insurance and will wait 90 days prior to enrolling in CHIP
- Based on other states' experience with CHIP, it was assumed that 75 percent of the eligible population would enroll in CHIP. This participation level serves as the base CHIP enrollment caseload forecast.

- The base enrollment forecast has been adjusted to reflect policy changes that were implemented during the fall of 2001.
- Enrollment forecasts are re-examined monthly to adjust for most recent enrollment history.
- The impact of policy adjustments on enrollment forecast is re-examined every six months.
- The cost per member per month consists of three different components:
 - Aggregate amount paid for Health Plan and Dental Plan Premiums
 - Cost of prescription drugs under the CHIP Prescription Drug Program (PDP)
 - Immunizations costs.

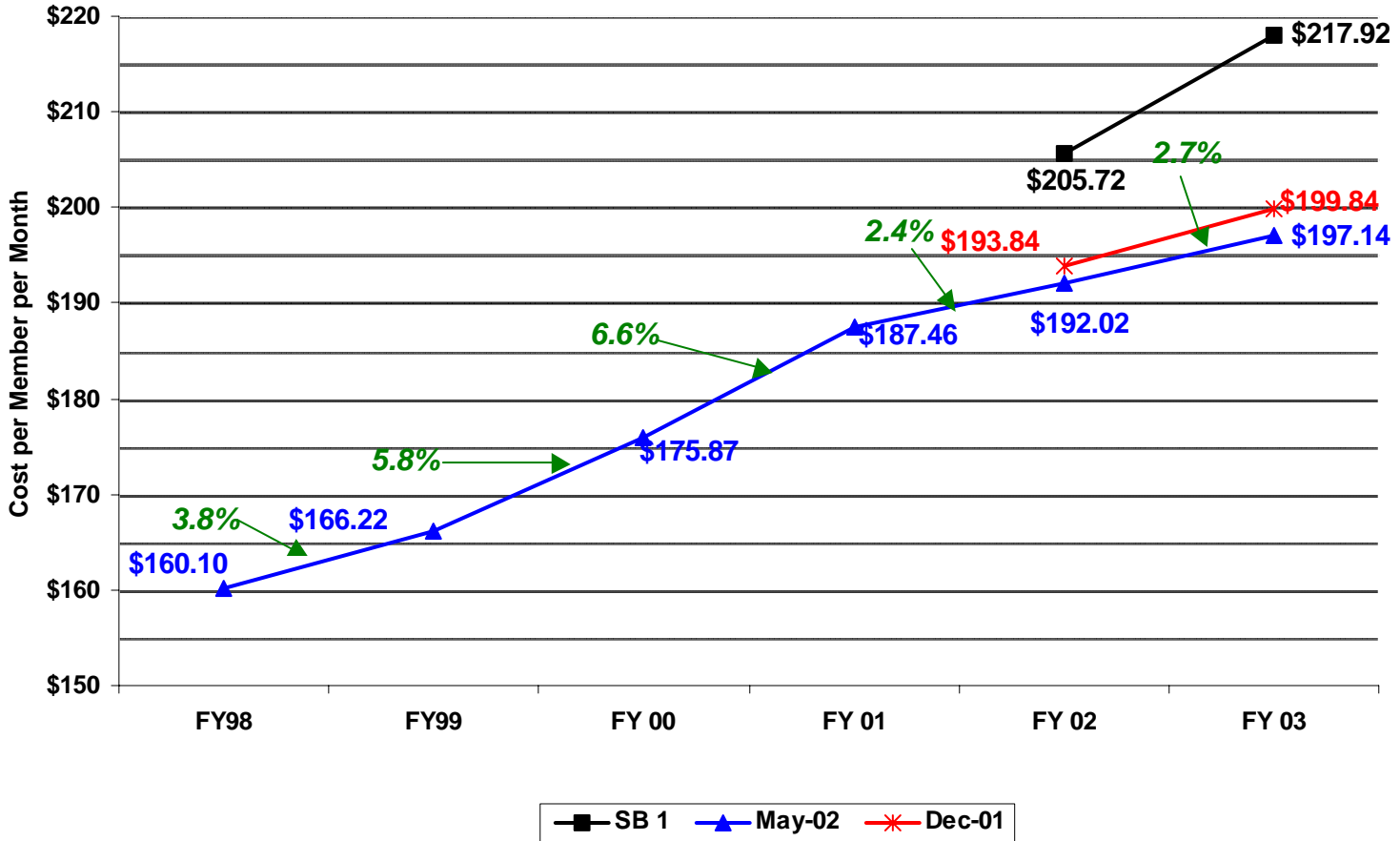
Service costs are projected using these components and the caseload forecast.

Medicaid and CHIP Update

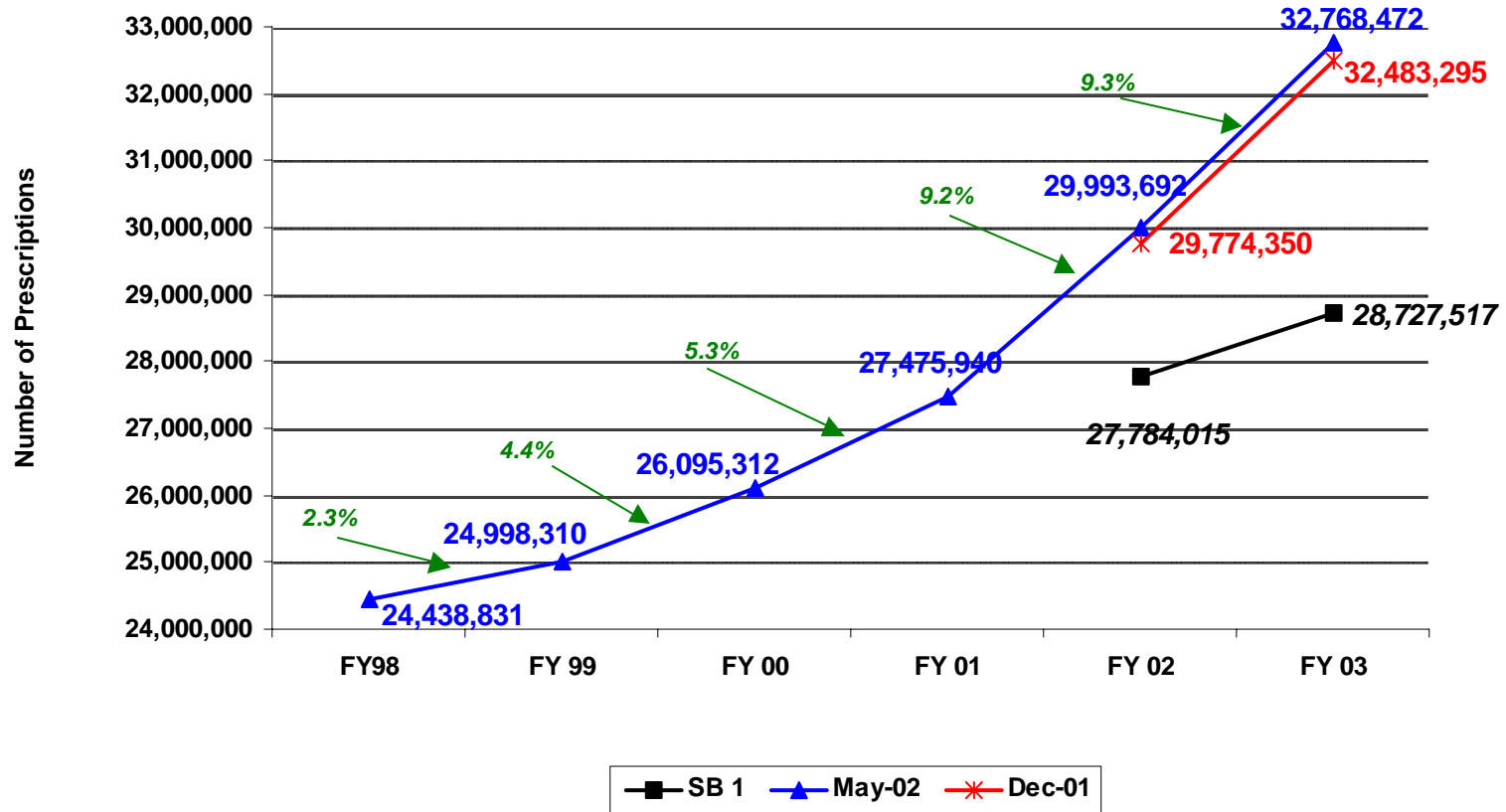
Average Monthly Medicaid Caseload



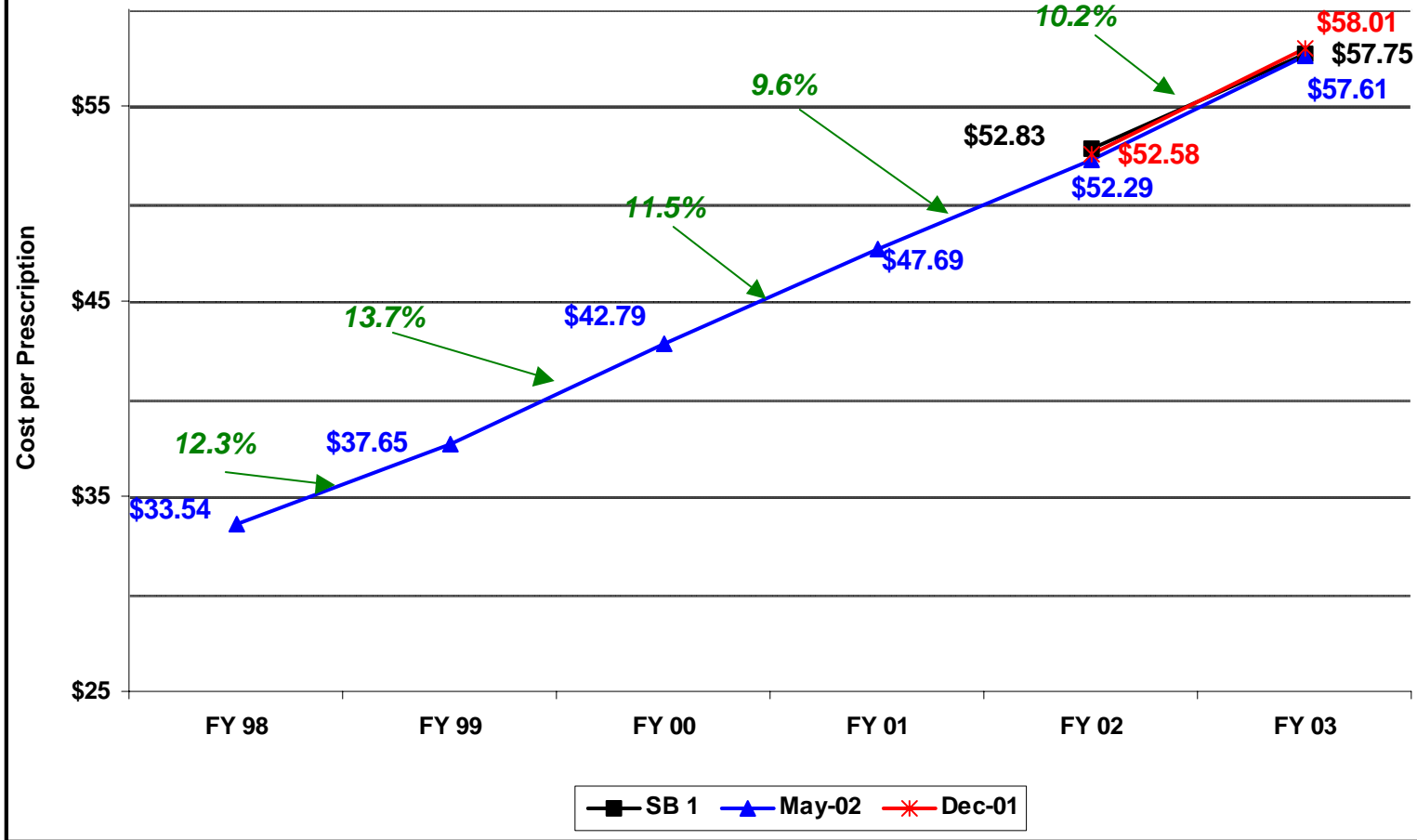
Average Monthly Medicaid Blended Cost



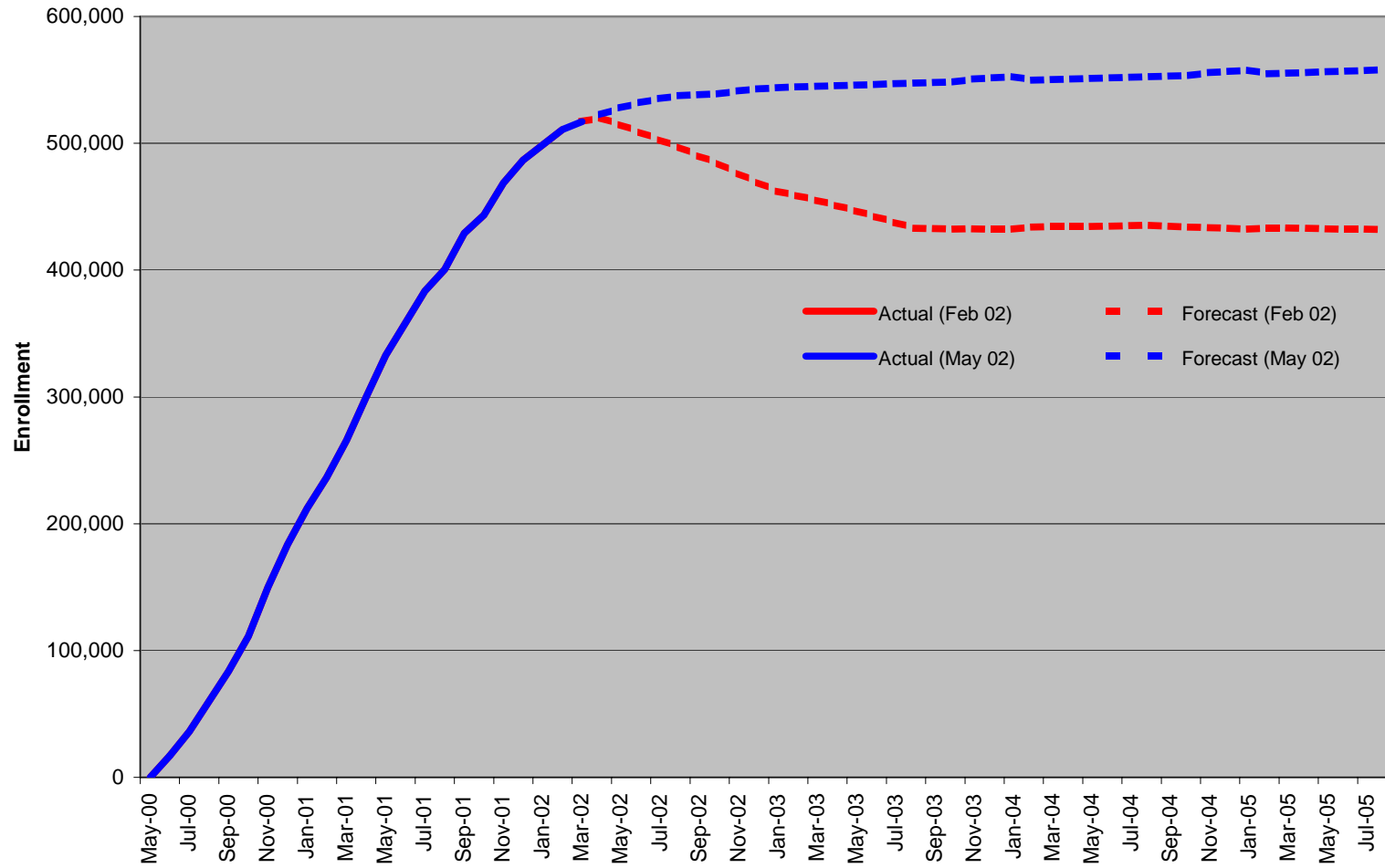
Number of Medicaid Prescriptions



Average Medicaid Prescription Cost



CHIP Caseload Forecast Comparison - Feb 2002 & May 2002



CHIP Caseload (April 2002) - Includes CHIP Phase II and Legal Immigrants

Month	Total Enrollment	New Enrollment	Renewals	Total Disenrollment
May-00	30	30		-
Jun-00	17,048	17,023		5
Jul-00	36,196	19,431		284
Aug-00	59,926	24,305		583
Sep-00	83,538	24,297		887
Oct-00	111,317	28,900		1,156
Nov-00	149,935	39,664		1,123
Dec-00	183,597	34,870		1,219
Jan-01	212,066	30,087		1,626
Feb-01	236,547	25,979		1,567
Mar-01	265,805	31,189		1,961
Apr-01	299,896	36,932		2,841
May-01	332,802	35,816	21	2,910
Jun-01	358,163	30,603	12,525	6,429
Jul-01	383,588	35,582	13,346	10,157
Aug-01	400,456	29,647	16,415	12,779
Sep-01	429,066	38,467	16,345	9,857
Oct-01	443,468	30,749	19,132	16,347
Nov-01	468,790	42,444	24,927	17,329
Dec-01	486,574	37,236	20,966	19,452
Jan-02	498,818	30,506	17,620	18,260
Feb-02	510,878	30,549	13,501	18,489
Mar-02	517,025	29,156	14,480	23,009
Apr-02	524,392	31,827	16,417	24,460