REPORT OF THE JOINT LEGISLATIVE AUDIT AND REVIEW COMMISSION

TECHNICAL REPORT: REVIEW OF THE MEDICAID FORECASTING METHODOLOGY

TO THE GOVERNOR AND
THE GENERAL ASSEMBLY OF VIRGINIA

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Preface

Currently, about one out of every seven dollars that the State spends from the general fund is on Medicaid. Consequently, legislative budgeting has become more dependent on reliable and accurate Medicaid expenditure forecasts. Legislative concern regarding the Medicaid forecasts themselves increased with the recent divergence between Medicaid forecasts generated by the Department of Medical Assistance Services (DMAS) and those generated by the Department of Planning and Budget (DPB).

As a result, House Joint Resolution 143 of the 1996 General Assembly Session directed JLARC to study "the current methodology used to forecast Medicaid expenditures." Further, JLARC was directed to "make recommendations regarding the soundness and usefulness of the methodology for decision-making."

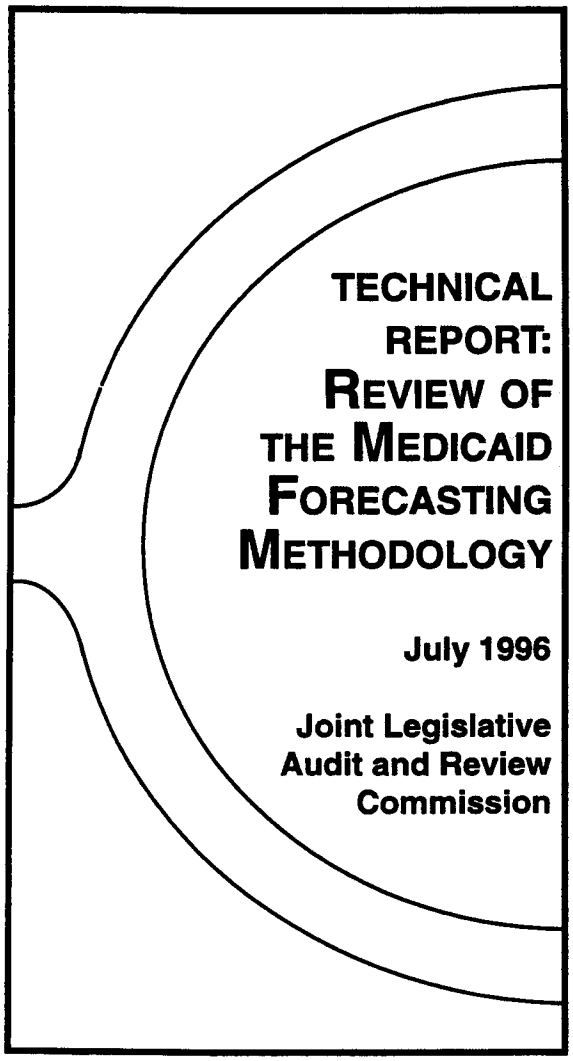
This report draws three main conclusions regarding the "soundness and usefulness for decision-making" of the Medicaid forecasting methodology. One is that Virginia's Medicaid expenditure estimates generally appear to be as accurate as, and at times more accurate than, those of other states nearby, in the South, or across the nation. Second, the Medicaid expenditure forecast models appear to be sound and to have improved since the 1992 JLARC study of Virginia's Medicaid system. Third, the current forecasting process can be improved to ensure that the final forecast is free of bias. If the General Assembly wishes to ensure that it receives an unbiased forecast (without independently generating its own), then a mechanism for expanded external review of the Medicaid forecasts is needed.

On behalf of JLARC staff, I would like to thank the budget staff from the Department of Medical Assistance Services and staff from the Department of Planning and Budget Economic and Regulatory Analysis Section for their cooperation and assistance during the course of this review.

Philip A. Leone
Director

July 16, 1996

JLARC Report Summary



The Virginia Medical Assistance Program, more commonly known as Medicaid, is the largest health care financing program available to indigent persons in Virginia. It provides reimbursement for a variety of health care services on behalf of qualified indigent persons. Medicaid is also among the fastest growing segments of the State's budget. In the past 10 years, Medicaid's percentage of the general fund budget has grown from approximately six percent to almost 15 percent.

Because approximately one out of every seven dollars that the State now spends is on Medicaid, legislative budgeting has become more dependent on reliable and accurate Medicaid expenditure forecasts. Legislative concern regarding the Medicaid forecasts themselves increased with the recent divergence between Medicaid forecasts generated by the Department of Medical Assistance Services (DMAS) and those generated by the Department of Planning and Budget (DPB). Consequently, House Joint Resolution 143 of the 1996 General Assembly Session directed JLARC to study "the current methodology used to forecast Medicaid expenditures." Further, JLARC is directed to "make recommendations regarding the soundness and usefulness of the methodology for decision-making."

This report first provides a description of Medicaid expenditures, and how they are forecasted by DMAS and by DPB. Then it assesses the accuracy of the forecasts in past years. Finally, it evaluates the adequacy of the Medicaid forecast models and process.

Development of Medicaid Expenditure Forecasts

In FY 1995, reimbursement for five types of services accounted for approximately 77 percent of total program expenditures. These were reimbursements for inpatient hospital services, nursing facility services, mental health and mental retardation services, physician services, and pharmacy services. Expenditures for inpatient hospital services and nursing facility services accounted for the largest portion of expenditures (25 and

18 percent, respectively). Expenditures for mental health and mental retardation services accounted for the next largest expenditure category (about 15 percent in FY 1995).

DMAS Approach to Forecasting Medicaid Expenditures. The approach used by DMAS staff to forecast Medicaid expenditures can be characterized in two steps. The first step is to project baseline expenditures (assuming that there are no policy changes or new mandates). The second step is to estimate the fiscal impact of policy changes and new mandates, and to combine the baseline projections with these estimated impacts to arrive at the final forecast for the DMAS budget proposal.

DMAS staff use primarily a univariate time series forecasting technique called exponential smoothing to generate the baseline forecasts for each expenditure category. DMAS staff currently use 159 exponential smoothing models to forecast 70 categories and sub-categories of Medicaid expenditures. The forecasts of the categories and sub-categories of expenditures are divided among six analysts in the DMAS budget section.

Although specific methods for estimating the impact of policy changes vary, depending on the specific type of policy change involved, staff generally follow three basic steps to derive these estimates. Staff must first estimate the size of the affected eligible population. Next, the degree to which the eligible population will utilize the services must be estimated. Finally, the anticipated number of recipients is multiplied by an estimate of the unit cost for the services to arrive at an estimated total cost for the policy change.

DPB Approach to Forecasting Medicaid Expenditures. DPB Economic and Regulatory Analysis Section staff employ two approaches in their forecasts of Medicaid expenditures. The principal method is an econometric model that utilizes multiple regression equations to predict Medicaid expenditures as a function of different causal factors, such as population projections for certain demographic groups, or health care inflation rates projected for future years. The other approach utilizes time series analysis methods, such as exponential smoothing, and regression in which time is used as an independent predictor. Then DPB staff average the forecasts generated from these two approaches for the major Medicaid expenditure categories.

Accuracy of the Medicaid Forecasts

Three key issues were examined to assess the accuracy of the Medicaid forecasts:

- How well does the information provided in past years to the General Assembly project funding needs for the program?
- How does the performance of Virginia's forecast compare with forecasts produced by other states?
- How do the DMAS and DPB forecasts compare with each other, and to actual expenditures?

Analysis of recent budget bill submissions, as projections of Medicaid expenditures provided to the General Assembly, indicates that they have been reasonably accurate from a forecasting perspective. Examination of budget bill projections for specific years indicates that there has been a tendency for underprojection for fiscal years 1991 through 1993, and for overprojection for fiscal years 1994 and 1995.

Compared to other states in the mid-Atlantic and southeastern regions, Virginia's Medicaid expenditure forecasts have tended to be slightly more accurate over the years. Further, Virginia's forecasts also have tended to be slightly more accurate than the na-

tional average. The magnitude of Virginia's underprojections in federal fiscal years 1991 through 1993 was far less than those of most other states, which may account for much of Virginia's better overall accuracy over the years.

When comparing DMAS and DPB projections made at about the same time for the same fiscal years, both appear to be reasonable forecasts of what Medicaid expenditures will be in an upcoming fiscal year. In aggregate, DPB forecasts for fiscal years 1995 and 1996 appeared to be more accurate than DMAS forecasts. But when examining forecasts of individual expenditure categories, DPB forecasts also appeared to differ more from actual expenditure estimates compared to DMAS forecasts; the errors in the DPB forecasts appeared to "cancel out" more when aggregated. Divergence between DPB and DMAS forecasts for longer forecast horizons indicates that it will be valuable in the future to maintain both sets of forecasts as alternative approaches that enhance scrutiny of Medicaid expenditure projections.

Adequacy of Forecast Models and Process

To assess the soundness and usefulness of the forecasting approaches, key criteria developed in past JLARC studies for evaluating the adequacy of forecast models and the forecasting process were used. After assessing the forecast models explicitly in terms of one set of criteria, the advantages and disadvantages of the different forecast methods are examined. Then, after evaluating the forecast process explicitly in terms of another set of criteria, some conclusions are drawn and recommendations are made for improving the process.

Assessment of Forecast Models. Six criteria were used for evaluating the DMAS and the DPB forecast models and their administration, as shown in the following exhibit. The DMAS models appear to conform substantially with five of the six criteria (criteria 1, 2, 4, 5, and 6), while questions arise concerning how the model parameters are derived and how frequently they may be adjusted (criterion 3). Similarly, the DPB models appear to conform substantially with five of the six criteria (criteria 1, 2, 3, 4, and 6), with questions arising with regard to the analysis of forecast errors (criterion 5). A recommendation for improving DMAS' forecast modeling resulted from this evaluation.

Recommendation (1). *The Department of Medical Assistance Services should periodically and systematically re-evaluate all exponential smoothing model parameters, and define systematically the conditions warranting re-estimation of the model parameters.*

Assessment of Forecasting Process. The overall forecasting process, from the inception of the forecasts at DMAS and DPB to the inclusion of a final forecast in the budget bill, was assessed against the five criteria shown in the following exhibit. The assessment indicated the process fully meets one (criterion 4) of the five criteria. However, there are questions concerning whether three are met under the current process (criteria 1, 2 and 3), and one (criterion 5) does not appear to have been met in recent years. Three recommendations resulted from this evaluation.

Recommendation (2). *The Department of Planning and Budget should be prepared to report its forecasts, as well as those generated by the Department of Medical Assistance Services, when it reports to the Chairmen of the House Appropriations and Senate Finance Committees by November 15 of each year, as required by the 1996 Appropriation Act. Further, the department should be prepared to report the basis of the final forecast to be chosen by November 15.*

Recommendation (3). *The General Assembly may wish to put in statute the*

Criteria for Evaluating Forecast Models and their Administration

	Current DMAS Models	Current DPB Models
1. Model assumptions are clearly understood by participants and periodically reviewed.	✔	✔
2. Variables used in models' equations are sufficient, accurately measured, and the best information available at the time.	✔	✔
3. Equations are mathematically sound and tested to ensure mathematical precision.	?	✔
4. Different regional conditions are taken into account sufficiently.	✔	✔
5. Forecast errors are analyzed on an ongoing basis.	✔	?
6. Forecast models are reviewed and documented well, including any judgmental or policy adjustments.	✔	✔

Criteria for Evaluating Forecasting Processes

	Current Virginia Process
1. The degree of uncertainty associated with forecasts should be understood by process participants.	?
2. The agency making forecasts should have the data and personnel required to generate a good estimate.	?
3. Regular reports on actual expenditures and their variance from forecasts should be developed and available to agency staff and interested external participants, as appropriate.	?
4. The process should maintain the flexibility to respond to dramatic changes in recipient utilization and program expenditures by revising the forecasts.	✔
5. The process should include a mechanism requiring some level of expanded review of the forecasts.	X

Key

✔ Meets criterion

X Does not meet criterion.

? Question concerning whether fully meets criterion

Source: Criteria from *Interim Report: Review of the Virginia Medicaid Program*, JLARC 1992.

November 15 deadline for reporting Medicaid forecasts to the Chairmen of the House Appropriations and Senate Finance Committees, if it wishes to maintain early reporting of these forecasts as an ongoing practice.

Recommendation (4). *The General Assembly may wish to amend the* Code of Virginia *to include a mechanism to ensure an expanded review of Medicaid expenditure forecasts. Such a mechanism could take the form of (1) a forecast review panel consisting of executive branch staff, (2) a review panel including legislative staff as well as executive branch staff, or (3) an advisory council including legislators and the Governor's appointees.*

Conclusions

Three main conclusions can be drawn regarding the "soundness and usefulness for decision-making" of the Medicaid forecasting methodology. One is that Virginia's Medicaid expenditure estimates generally do not appear to be less accurate than those of other states nearby, in the South, or across the nation. Second, the forecast modeling itself appears to be sound and to have improved since the last time JLARC studied it in 1992. Third, the current forecasting process can be improved to ensure that the final forecast is free of bias. If the General Assembly wishes to ensure that it receives an unbiased forecast (without independently generating its own), then a mechanism for expanded review of the Medicaid forecasts is needed.

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I. Introduction

The Virginia Medical Assistance Program (Medicaid) is a federally-mandated, State-administered program to provide basic health care services to low income Virginians. The program was created by Congress in 1965 as Title XIX of the Social Security Act. Since its creation in 1965, the program has been greatly expanded. Nationally, more than 30 million low income individuals received medical care under the Medicaid program in 1994. Program expenditures in that year totalled over $78.8 billion.

In Virginia, the Medicaid program became operational in 1969. Medicaid was first administered by the Department of Health, but was later transferred to a separate agency established specifically to manage the program. Today, the Department of Medical Assistance Services (DMAS) is responsible for administering the Medicaid program.

In fiscal years 1990, 1991, and 1992, Medicaid enrollments grew by ten to fifteen percent each year, with Medicaid expenditures subsequently growing at similarly high rates as well. These accelerated rates of growth created problems in forecasting future Medicaid expenditures. Beginning in 1993, growth in Medicaid enrollments and expenditures has been slowing, which could again be causing problems in forecasting future Medicaid expenditures. This report examines the accuracy and adequacy of the current Medicaid forecast models and process.

JLARC REVIEW

House Joint Resolution 143 of the 1996 General Assembly Session directed JLARC to study "the current methodology used to forecast Medicaid expenditures." This review is to address:

- whether current population-based forecasting is sufficient, or whether demographic analysis is necessary to improve cost projections;
- how Virginia's forecast models compare with those used in other states and by the federal government; and
- technical and organizational aspects of the forecast methodology.

Further, this review is to address "the soundness and usefulness of the methodology for decision-making." The study mandate is shown in Appendix A.

JLARC had previously examined the Medicaid forecast models and process, as documented in the 1992 interim report, *Review of the Virginia Medicaid Program*. The findings from the 1992 JLARC review can be summarized as follows:

- In general, the forecast and budget process appeared to be sound.

- Minor weaknesses were found with: (1) the process for forecasting Medicaid-eligible mental health services; (2) documentation of the forecast models; and (3) the degree to which the forecast models received review outside of DMAS.

In light of how the Medicaid forecast methodology has changed since the 1992 study, three primary issues are addressed in this study:

1. How well does the information provided to the General Assembly project Medicaid funding needs?

2. How does the performance of Virginia's forecast process compare with forecasts produced by other states and reported to the Federal government?

3. How well do the Medicaid forecast models and process meet criteria for forecast adequacy and soundness?

Research activities undertaken to address these study issues include interviews, document reviews and secondary data analyses. Interviews were conducted with DMAS and Department of Planning and Budget (DPB) staff. Documents and secondary data reviewed include: DMAS and DPB forecast model and budget projection documentation; budget bills from the 1988 through 1995 General Assembly sessions; DMAS financial statements; and U.S. Health Care Financing Administration (HCFA) documents showing Medicaid expenditure projections and actual expenditures for all 50 states.

REPORT ORGANIZATION

The remaining chapters of this report describe the forecast models and process, examine the accuracy of projections, and assess their adequacy in terms of independent criteria. Chapter II briefly describes the Medicaid forecast models and process. The chapter focuses specifically on the development of the DMAS and DPB forecast models, and outlines the process for choosing a forecast for the Medicaid budget.

Chapter III examines issues concerning the past accuracy of Medicaid forecasts. Projections of Medicaid expenditures submitted in budget bills in past years are compared with actual Medicaid expenditures from each given fiscal year. Further, projections of Medicaid expenditures submitted to the federal government by Virginia and other states are compared with actual expenditures as well. In addition, DMAS and DPB forecasts for FY 1995 and FY 1996 are compared to each other and with the most recent actual expenditure data available.

Chapter IV assesses the adequacy of the Medicaid forecast models and process. This assessment includes a technical assessment of the advantages and disadvantages of the different forecast approaches used. Further, the forecasting process is evaluated, and some recommendations for improvement are made. The chapter concludes with an overall assessment of the soundness and usefulness of the Medicaid forecast methodology for decisionmaking.

II. Development of Medicaid Expenditure Forecasts

Forecasting Medicaid expenditures is not a simple task. Over time, the State has found it necessary to use more and more sophisticated forecasting techniques and approaches, and to have more than one agency involved in generating forecasts. Further, the different types of Medicaid expenditures themselves must be explicitly taken into account, which can make the forecast modeling complicated.

To provide a sense of what is being forecasted, this chapter first examines the range of different types of Medicaid expenditures. Then the Department of Medical Assistance Services (DMAS) approach to forecasting them is described, followed by a description of the Department of Planning and Budget (DPB) forecasting approach. Finally, the process for choosing a final forecast for the Medicaid budget is summarized.

BACKGROUND ON MEDICAID EXPENDITURES

Currently, approximately one out of every seven dollars that the State spends is on Medicaid. Total expenditures for the Medicaid program in FY 1995 were more than $2.1 billion for a wide variety of health care services. This amount includes approximately $2.06 billion in medical care expenditures for 643,949 recipients and approximately $45 million in expenditures for program administration.

Types of Services Provided

As with all state Medicaid programs, certain services provided by Virginia's program are mandated by the federal government. These programs include:

- inpatient hospital services,
- outpatient hospital services,
- physician services,
- nursing facility care,
- home health services,
- laboratory and x-ray services,
- family planning services,
- Early and Periodic Screening, Diagnostic and Treatment services,
- nurse-midwife services,

- rural health clinic services,
- federally qualified health center clinic services,
- Medicare premiums: hospital insurance (Part A),
- Medicare premiums: supplemental medical insurance (Part B) for the categorically needy, and
- transportation services.

In addition to the federally-mandated service categories, Virginia has elected to provide services in the following major optional categories:

- dental services for individuals under 21 years of age,
- intermediate care facility - mental retardation services,
- mental hospital services for the aged (65 years and older),
- pharmacy services,
- other clinic services,
- other practitioner services,
- rehabilitation services,
- hospice services,
- durable medical equipment, and
- Medicare premiums: supplemental medical insurance (Part B) for the medically needy.

Further explanation of these categories is provided in Appendix B.

Expenditures by Service Category and Type of Recipient

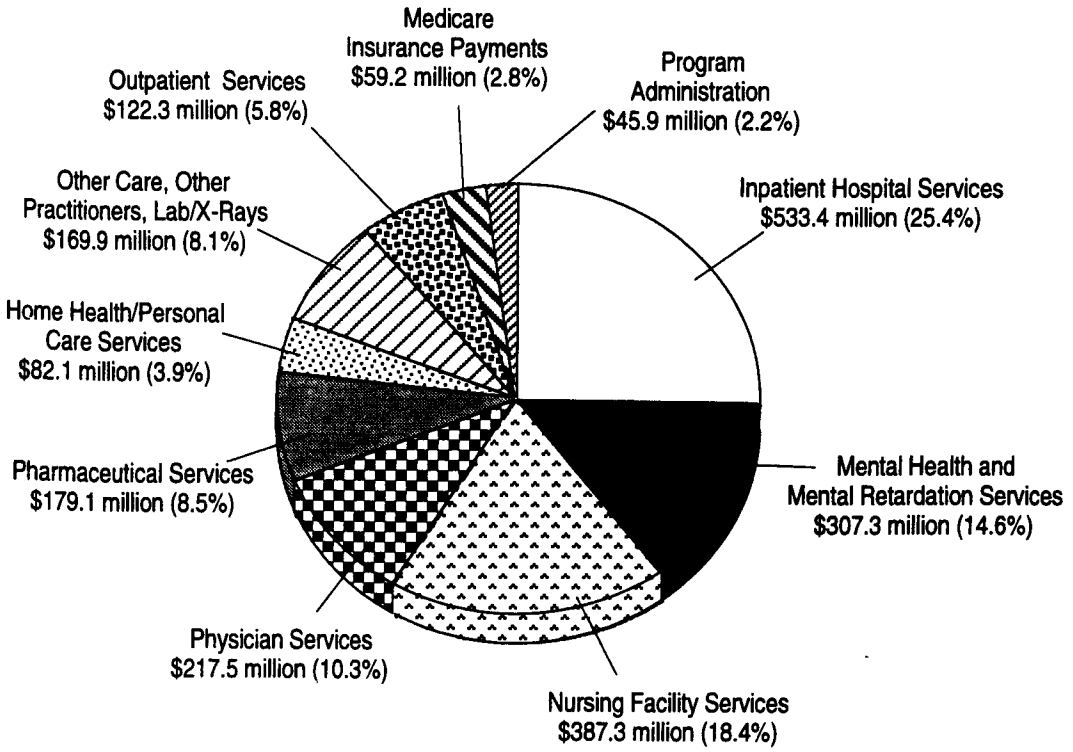
In FY 1995, reimbursement for five types of services accounted for approximately 77 percent of total program expenditures, as shown in Figure 1. These were reimbursements for inpatient hospital services, nursing facility services, mental health and mental retardation services, physician services, and pharmacy services. Expenditures for inpatient hospital services and nursing facility services accounted for the largest portion of expenditures (25 and 18 percent, respectively). Expenditures for mental health and mental retardation services accounted for the next largest expenditure category (about 15 percent in FY 1995).

The majority of program expenditures (70 percent) during FY 1995 were directed towards care of the aged and disabled, though they accounted for only 13 and 15 percent of the total number of recipients, respectively (Figure 2). Conversely, less than one-third of total program expenditures were spent on adults with children (primarily

Figure 1

FY 1995 Medicaid Expenditures

Total Expenditures = $2.1 billion



Source: *The Statistical Record of the Virginia Medicaid Program*, DMAS, October 1995.

women) and children (age 20 and younger), who comprised almost three-fourths of Virginia's Medicaid recipients in FY 1995.

Reimbursement Methods Affecting How Expenditures Are Forecasted

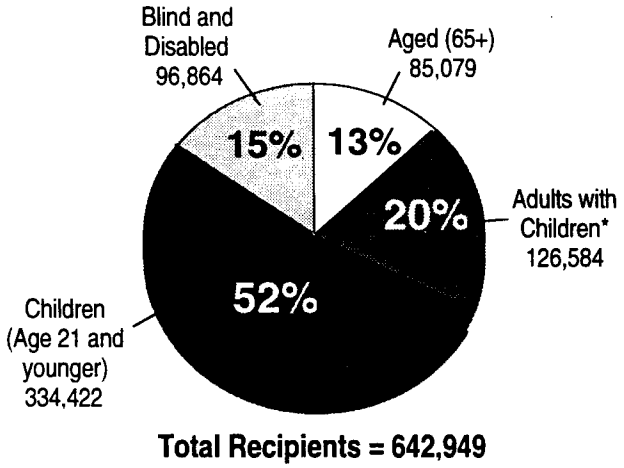
A key distinction made in forecasting Medicaid expenditures is between "fee-for-service" programs and "managed care" programs. Medicaid does not directly provide medical services to eligible individuals enrolled in the program. It provides financial reimbursement to health care professionals and institutions for providing approved medical services, products, and equipment to Medicaid enrollees.

Traditionally, Medicaid has paid most service providers a set fee for the specific type of service rendered to Medicaid enrollees (termed "fee-for-service" reimbursement). Payments are based on the lesser of the State's fee schedule, the actual charge, or federal Medicare allowances.

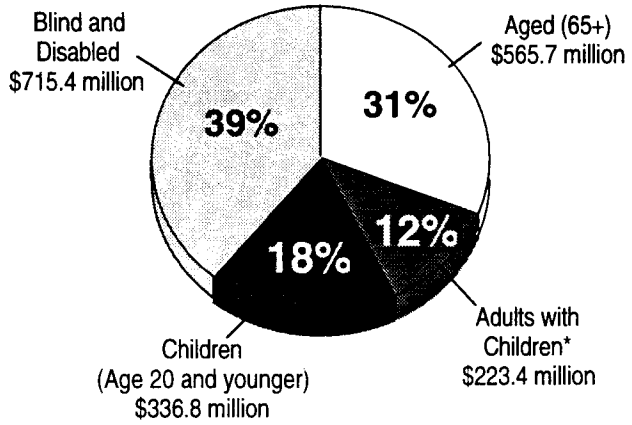
Figure 2

Number and Type of Medicaid Recipients Compared to Expenditures for Each Recipient Group (Fee-for-Service Programs) FY 1995

Medicaid Recipients



Medical Care Expenditures by Recipient Groups



*This group includes pregnant women and ADC-related adults.

Source: *The Statistical Report on the Virginia Medicaid Program*, DMAS, October 1995.

As an alternative to traditional fee-for-service reimbursement, in recent years the State has been increasing its enrollment of Medicaid beneficiaries in managed care plans. Managed care plans generally fall into three categories:

- *Primary care case management plans* are very close to the traditional fee-for-service system. The beneficiary chooses a primary care provider (physician or clinic) from an approved list, and that provider becomes responsible for authorizing any specialty care the beneficiary needs. The provider is usually paid a modest monthly fee, typically $3 to $5 a month, for the management of care and referrals, but is reimbursed on a regular fee-for-service basis for the care delivered to the patient. The provider is not at financial risk for the cost of care for any referrals.

- *Capitated at-risk plans* are ones in which the beneficiary receives all care through a single point of entry, and the plan is paid a fixed monthly premium per beneficiary for any health care included in the benefit package regardless of the amount of services actually used. The beneficiary is responsible for, at most, modest co-payments for services; the provider is at risk for the remaining cost of care. A capitated plan can be a network of physicians and clinics, all of whom participate in the plan and also participate in other plans or fee-for-service systems, or it can be one which hires all the physicians and they provide all the care required.

- *Partially capitated plans* are a variation on the capitated at-risk plans. Sometimes the capitation rates are set so the risk is shared between the plan and the insurer. Typically they are used in situations in which there is insufficient experience, either with the cost of the benefit package or the population covered, for the insurer and provider to agree upon a fully capitated rate.

In forecasting Medicaid expenditures, the costs of recipients enrolled in managed care plans are generally treated separately from the other (fee-for-service) categories. This practice means that services provided to managed care enrollees are not to be included when forecasting the large "fee-for-service" categories, such as inpatient hospital services or physician services. Although the expenditures for managed care in FY 1995 were relatively small (approximately $16 million out of $2.06 billion spent on total medical services), DMAS plans to expand managed care in the Medicaid Program for the purpose of improving access to health care and containing costs. Consequently, managed care will become a bigger factor in forecasting Medicaid expenditures in future years.

Given that Medicaid has grown substantially over the last several years as a percentage of the State's General Fund budget, the need for accurate forecasts of Medicaid expenditures has grown as well. Therefore, the DMAS Budget Section has developed one approach, and the DPB Economic and Regulatory Analysis Section has developed another. Together, multiple approaches are used to provide alternative

forecasts, each with different strengths, to enhance confidence in the final forecast when they converge, and, when they diverge, to avoid unpleasant surprises from overconfidence in one "right" forecast.

DMAS APPROACH TO FORECASTING MEDICAID EXPENDITURES

The approach used by DMAS staff to forecast Medicaid expenditures can be characterized in two steps. The first step is to project baseline expenditures (assuming that there are no policy changes or new mandates). The second step is to estimate the fiscal impact of policy changes and new mandates, and to combine the baseline projections with these estimated impacts to arrive at the final forecast for the DMAS budget proposal.

Throughout this chapter, the phrases "policy changes" and "new mandates" are used interchangeably because they present very similar types of estimation problems. However, policy changes are generally defined as program changes initiated within the State. For example, an increase in physician fees proposed by the executive branch and approved by the General Assembly would be considered a policy change. New mandates are generally defined as program changes initiated by the federal government. For example, the Omnibus Budget Reconciliation Act of 1990 requirement that infants under 133 percent of the federal poverty income level be covered by Medicaid throughout their first year of life would be considered a new mandate.

Developing Baseline Forecasts

DMAS staff generate baseline forecasts for major expenditure categories using the "classic expenditure model" suggested by the U. S. Department of Health and Human Services. This "classic expenditure model" can be characterized as:

Expenditures = Caseload x Average Utilization x Price.

Consequently, for the typical expenditure category, DMAS staff generate a separate forecast for the number of units (corresponding to "Caseload x Average Utilization") and another separate forecast for cost per unit (corresponding to "Price"). Often, for a given expenditure category, DMAS staff also have a forecast for "Add/Pays" or remittances, which are routine adjustments in payments made to providers. To produce a forecast of total expenditures in a typical expenditure category, then, DMAS staff would multiply the forecasted number of units times the forecasted cost per unit, and add forecasted "Add/Pays" and remittances to this amount.

DMAS staff use primarily a univariate time series forecasting technique called exponential smoothing to generate the baseline forecasts for each expenditure category. Exponential smoothing is a form of a weighted moving average applied to time series

data. Moving averages predict the next value in a time series based on the average of some finite number of previous observations. Moving averages that count recent values more are weighted moving averages. An exponential smoothing model is a special case of a weighted moving average: the weight for the most recent observation in the time series is the largest, and the other weights decline in size as other observations become more distant in time (declining at a rate resembling an exponential function). In addition, exponential smoothing models can be adjusted to take trends and seasonal effects in the time series data into account.

DMAS staff currently use 159 exponential smoothing models to forecast 70 categories and sub-categories of Medicaid expenditures. The forecasts of the categories and sub-categories of expenditures are divided among six analysts in the DMAS budget section. These analysts update the models approximately once each month with new data, and monitor the forecasts for fluctuations or when the forecasts appear to be inaccurate. Each analyst is not only assigned specific program forecasts to track, but also specific programs themselves on a more qualitative level. Therefore, if a forecast of a certain program appears to be fluctuating or suddenly appears to be differing from actual expenditure data recently coming in, the budget analyst is generally expected to consult DMAS program operations staff who have direct knowledge about program implementation and possible utilization trends, to identify reasons that may explain the unexpected differences.

Estimating the Impact of Policy Changes and New Mandates

Once the baseline forecasts have been developed, DMAS budget staff must attempt to factor in the impact of policy changes and new mandates that will take effect during a given fiscal year. Although specific methods for estimating the impact of policy changes vary, depending on the specific type of policy change involved, staff generally follow three basic steps to derive these estimates. Staff must first estimate the size of the affected eligible population. Next, the degree to which the eligible population will utilize the services must be estimated. Finally, the anticipated number of recipients is multiplied by an estimate of the unit cost for the services to arrive at an estimated total cost for the policy change.

There are four reasons why projecting the impact of policy changes and new mandates can be one of the most difficult aspects of budgeting for the Medicaid program. First, there may be little data from which to generate a cost estimate, such as when new mandates are intended to serve new eligible populations (which has frequently occurred in the past). Consequently, DMAS budget staff must use whatever data and information are available to make their "best guess" of the impact of the policy change.

Second, budget staff must determine how policy changes will be added to the baseline forecast. Depending on the type of policy change, the fiscal impact of the change may occur almost immediately. For example, the implementation of a provider fee increase will probably have a one-time, predictably-timed impact. On the other hand, the

impact of another policy change may occur over the course of several months or even years. Such has been the case of phasing in managed care. In this kind of situation, the forecaster must consider the speed with which eligible groups will become enrolled, how quickly they will decrease utilizing services that are provided on a fee-for-service basis, and when claims billings will begin reflecting the change. Further, although some information may be available to help the forecaster estimate the phase-in period, the estimates can also be highly sensitive to subjective judgments or assumptions that must be made.

Third, budget staff must determine the rate at which the data used for the baseline forecasts will capture the impact of the new policy changes. If the impact of a policy change is added into the baseline data too soon, it may bias the baseline forecast for subsequent years upwards. If it is not added into the baseline data and dealt with separately, then over time the baseline data would become further removed from reality, and a number of external adjustments for policy changes would accumulate, which could make the forecasting more and more cumbersome.

Fourth, evaluating the accuracy with which policy changes are estimated is problematic because it is difficult to isolate the effects of particular policy changes from other changes in the baseline forecasts. For example, DMAS may anticipate an increase in hospital expenditures due to covering a new eligible population. However, if hospital expenditures do in fact increase, it cannot be clearly determined how much of the increase is really due to increased utilization by existing eligible populations and how much is due to the new eligible population.

DMAS budget staff have developed methods for taking certain types of policy changes into account more systematically when estimating forecasts from the exponential smoothing models. Using this technique enables DMAS staff to use the baseline forecasts more as a tool for projecting overall increases in program expenditures, including selected policy changes. In this way, the forecast error is more meaningful in assessing both the baseline forecasts and policy changes that can be anticipated within the baseline forecasts.

DPB APPROACH TO FORECASTING MEDICAID EXPENDITURES

The DPB Economic and Regulatory Analysis section employs two approaches in its forecasts of Medicaid expenditures. The principal method is an econometric model that utilizes multiple regression equations to predict Medicaid expenditures as a function of different causal factors, such as population projections for certain demographic groups, or health care inflation rates projected for future years. The other approach utilizes time series analysis methods, such as exponential smoothing, and regression in which time is used as an independent predictor. Then DPB staff average the forecasts generated from these two approaches for the major Medicaid expenditure categories.

DPB Econometric Model

The DPB econometric model is comprised of a system of multiple regression equations. The functional forms of the equations are listed in Exhibit 1. (Further details explaining the variables used in these equations are in the 1996 DPB document *Indigent Demand for Health Care in Virginia: An Econometric Approach to Medicaid Forecasting.*) Multiple regression is a standard statistical technique which can be used to summarize the relationship between a dependent variable and one or more independent variables. Regression analysis produces an equation which best summarizes how much impact the independent variables have in increasing or decreasing the dependent variable. The equation generally contains a "constant," which represents the value of the dependent variable when all the independent variables are equal to zero. The equation also contains "coefficients" for each independent variable. Each coefficient indicates by how much the dependent variable tends to increase or decrease when a given independent variable changes.

A major reason DPB staff developed the econometric model was in order to use additional information concerning "outside factors" that are related to Medicaid expenditures, rather than extrapolating only from the existing expenditure data themselves. Projections for key demographic groups (such as the aged or women in childbearing years) that show future population shifts could be used in predicting future Medicaid expenditures for members of these groups. Further, this alternative approach could provide a means for including the effects of policy changes or new mandates in the model itself (in the form of a change in the value of an independent variable), rather than having to estimate a baseline forecast and then the impacts of policy changes or new mandates separately.

As DPB staff have observed, there is already a considerable amount of literature in which econometric models are used to predict hospital cost functions. Therefore, applying a regression model approach to Medicaid expenditures would not be a radical departure from what is already being done in the field of health economics. However, it would provide an alternative way to predict Medicaid expenditures.

DPB Time Series Analysis and Review

DPB staff conduct their own time series analyses, in addition to those of DMAS staff, for two reasons. One is that this analysis serves as corroborating information that is useful for checking the predictions from the econometric model. Using two methods can sometimes enhance certitude or undermine a false sense of certainty, while providing better guidance on probable error ranges.

Another reason is to provide an independent check on the DMAS forecasts resulting from an exponential smoothing approach. Exponential smoothing forecasts can be very sensitive to the choice of model parameters. Further, the values of these parameters that maximize the fit of the model to the actual data may change over time.

Exhibit 1

DPB Medicaid Econometric Model

Physician Costs	= f (weeks, total Medicaid population)
Physician Units	= f (weeks, outpatient visits, total Medicaid population)
Outpatient Visits	= f (weeks, total Medicaid population)
Nursing Home Costs	= f (weeks, paid days)
Nursing Home Paid Days	= f (aged population, other long term care, weeks)
Nursing Home Pharmacy	= f (nursing home days, weeks)
Regular Pharmacy Costs	= f (weeks, physician units, outpatient visits)
Other Long Term Care Cost	= f (aged population, blind & disabled pop., weeks)
Other Medicaid Costs	= f (blind and disabled population, weeks)
AFDC Inpatient Costs	= f (deseasonalized AFDC admissions, inflation)
Deseasonalized AFDC Admissions	= f (adult AFDC population, child AFDC population)
AFDC Inpatient Paid Days	= f (deseasonalized AFDC admissions)
Pregnant AFDC Inpatient Costs	= f (deseasonalized pregnant AFDC admissions, inflation)
Deseasonalized Pregnant AFDC Admissions	= f (pregnant women enrolled in AFDC)
Pregnant AFDC Inpatient Costs	= f (deseasonal. pregnant AFDC inpatient days, inflation)
Deseasonalized Pregnant AFDC Inpatient Days	= f (deseasonalized pregnant AFDC admissions)
Aged Inpatient Costs	= f (deseasonalized aged admissions, inflation)
Deseasonalized Aged Admissions	= f (number enrolled in Aged category)
Deseasonalized Aged Inpatient Days	= f (deseasonalized aged admissions)
Disabled Inpatient Costs	= f (deseasonalized disabled admissions, inflation)
Deseasonalized Disabled Inpatient Days	= f (deseasonalized disabled admissions)
Deseasonalized Disabled Admissions	= f (number enrolled in Blind & Disabled category)

Source: *Indigent Demand for Health Care in Virginia: An Econometric Approach to Medicaid Forecasting*, DPB, 1996.

DPB staff generate their own exponential smoothing models to assess the strengths and weaknesses of applying this approach to time series data from different expenditure categories. They assess the parameters of their exponential smoothing models, check for parameter stability in the time series, and estimate the impact of recent policy shifts.

DPB staff have found that if the trend in expenditure data changes dramatically or frequently, the exponential smoothing model parameters may not produce accurate forecasts. Therefore, DPB analysis concentrates substantial attention on spotting statistically significant changes in the trend for each time series. If a statistically significant change in the time series trend is found, then DPB staff would replace the exponential smoothing model with a regression model that uses time as an independent variable and that explicitly allows for changes in trend. This regression model does not require any information other than the time series itself. The methods used by DPB in their analysis for each time series are shown in Exhibit 2.

Exhibit 2

Methods Used in DPB Time Series Analysis

Time Series	Estimation Method
Nursing facility costs	Regression
Nursing facility Medicare crossover costs	Exponential smoothing
Nursing facility units	Exponential smoothing
Nursing facility remittances	Exponential smoothing
Physician costs	Regression
Physician Medicare crossover costs	Regression
Physician units	Regression
Physician costs per unit	Regression
Nursing facility pharmacy costs	Exponential smoothing
Non-nursing facility pharmacy costs	Regression
Nursing facility pharmacy units	Exponential smoothing
Non-nursing facility pharmacy units	Regression
Nursing facility pharmacy cost per unit	Exponential smoothing
Non-nursing facility pharmacy cost per unit	Regression
Outpatient hospital costs	Regression
Outpatient hospital Medicare crossover costs	Exponential smoothing
Outpatient clinic costs	Exponential smoothing
Outpatient hospital units	Regression
Outpatient cost per unit	Regression
Outpatient hospital remittances	Regression

Source: *Indigent Demand for Health Care in Virginia: An Econometric Approach to Medicaid Forecasting*, DPB, 1996.

Combining Econometric Model and Time Series Forecasts

DPB staff average two and often three independent forecasts of each of the major Medicaid categories of medical service: inpatient hospital, outpatient hospital, physician care, nursing facility care, pharmacy costs, other (alternative) long term care, and "other" medical services. DPB staff have said that combining two or more forecasting methods can enhance each other in areas of relative strength. The econometric model, for example, would often be stronger in the long term, such as when significant demographic or policy shifts are expected. On the other hand, in the very short term, a well designed time series model may produce the most consistently accurate forecasts. The forecasts averaged for each major Medicaid category is summarized in the following sections.

Inpatient Hospital. Forecasts from two different approaches are averaged. The first is a time series model that employs the traditional utilization approach to estimating Medicaid costs:

(cost per unit) x (units per person) x caseload.

The second approach is an econometric model that estimates costs per admission.

Outpatient Hospital. Three types of time series forecasts are first averaged: (1) a forecast of aggregate total monthly costs; (2) a sum of disaggregated monthly costs, in which separate forecasts are made for direct claims-related and for Medicare-related costs; and (3) a forecast of the average price for one outpatient visit is multiplied by the forecast of the number of visits for outpatient care. The combination of these time series forecasts is then averaged with the forecast from the econometric model.

Physician Care. A univariate time series forecast of total monthly physician costs is averaged with the forecast from another time series model which uses a utilization approach, multiplying a projection of the number of procedures performed by physicians with a projected average cost per procedure. This combined time series forecast is then averaged with the econometric model forecast.

Nursing Facility Care. The same procedure is used as for outpatient hospital costs. Three types of time-series-based forecasts are averaged, and then this combined forecast is averaged with that from the econometric model.

Pharmacy. Pharmacy utilization differs considerably between those clients who reside in nursing facilities and those who do not. Accordingly, DPB staff average two time series forecasts for nursing home clients and two time series forecasts for non-nursing home clients. Then this combined forecast is averaged with the forecast from the econometric model.

Other (Alternative) Long Term Care. A univariate time series forecast is averaged with the forecast from the econometric model to form the base forecast in this expenditure category. Three additional forecasts (all univariate time series) are added to this base: costs associated with clients using ventilators, mental health services, and add-pays.

Other Medicaid Costs. The remaining costs are grouped together and projected using a univariate time series forecast.

PROCESS FOR CHOOSING FINAL FORECAST FOR MEDICAID BUDGET

At some point a final set of projections of anticipated Medicaid expenditures must be chosen in order to prepare a budget for upcoming fiscal years. In general, projections of Medicaid expenditures for future years have been treated within the usual executive branch budgeting process. But the process for choosing the final forecast also appears to have varied in past years.

In 1991, for example, the standard budgeting process was for DMAS first to submit its budget proposal to DPB. This budget proposal would include estimates based on forecasts generated by DMAS for most expenditure categories and by the Department of Mental Health, Mental Retardation and Substance Abuse Services (DMHMRSAS) for mental health service expenditures at DMHMRSAS facilities that were eligible for Medicaid reimbursement. Then DPB budget staff would review the budget proposal, comparing the DMAS forecast estimates to an in-house forecast of Medicaid expenditures. This information would be used, in conjunction with any program initiatives approved by the Governor, by DPB budget analysts to develop the budget bill which was submitted to the General Assembly. The final Medicaid expenditure forecast on which the budget bill was based was a product of interaction and information exchange between DMAS and DPB staff. At that time the process included more collaboration and consensus-building between the two agencies.

In contrast, in 1995 the Appropriation Act required DPB staff to report Medicaid expenditure forecasts to the Senate Finance Committee by November 15. By this time, DMAS had completed a set a forecasts on which its budget proposal for Medicaid was based. DMAS staff also forecasted expenditures for mental health services that had been forecasted by DMHMRSAS staff in previous years. But DPB staff had not yet completed their own time-series analysis and econometric modeling, nor was the budget bill ready for submission to the General Assembly. Further, there was relatively less interaction and information exchange between DMAS and DPB staff when the final forecast was to be chosen for the budget bill.

According to DPB forecasting staff, once they submitted their forecast to the Governor (who already had the DMAS forecast and budget proposal), they were no longer involved in the decision-making process for choosing a final forecast on which the budget bill was to be based. Consequently, when the General Assembly received the budget bill for the 1996 session, the Medicaid expenditure projections appeared to be substantially lower, because they were based on the DPB forecasts, rather than the DMAS forecasts presented earlier in November. Apparently differences between the DMAS and DPB forecasts had not been resolved using a consensus-building process.

III. Accuracy of the Medicaid Forecasts

From the perspective of the General Assembly, the most important consideration regarding the Medicaid forecast and budget is the accuracy with which the budget reflects funding needs for the program. Forecasting is an inexact science and forecast errors are inevitable. However, given the size of the Medicaid budget, even minor errors can result in large budget shortfalls or surpluses. Three key issues were examined to assess the accuracy of the Medicaid forecasts:

- How well does the information provided in past years to the General Assembly project funding needs for the program?
- How does the performance of Virginia's forecast compare with forecasts produced by other states?
- How do the DMAS and DPB forecasts compare with each other, and to actual expenditures?

Analysis of recent budget bill submissions, as projections of Medicaid expenditures provided to the General Assembly, indicates that they have been reasonably accurate from a forecasting perspective. Examination of budget bill projections for specific years indicates that there was a tendency for underprojection for fiscal years 1991 through 1993, and for overprojection for fiscal years 1994 and 1995.

Compared to other states in the mid-Atlantic and southeastern regions, Virginia's Medicaid expenditure forecasts have tended to be slightly more accurate over the years. Further, Virginia's forecasts also have tended to be slightly more accurate than the national average as well. The magnitude of Virginia's underprojections in federal fiscal years 1991 through 1993 was far less than those of most other states, which may account for much of Virginia's better accuracy over the years.

When comparing DMAS and DPB projections made at about the same time for the same fiscal years, both appear to be reasonable forecasts of what Medicaid expenditures will be in an upcoming fiscal year. In aggregate, DPB forecasts for fiscal years 1995 and 1996 appeared to be more accurate than DMAS forecasts. But when examining forecasts of individual expenditure categories, DPB forecasts also appeared to differ more from actual expenditure estimates compared to DMAS forecasts; the errors in the DPB forecasts appeared to "cancel out" more when aggregated. Divergence between DPB and DMAS forecasts for longer forecast horizons indicates that it will be valuable in the future to maintain both sets of forecasts as alternative approaches that enhance scrutiny of Medicaid expenditure projections.

COMPARISON OF BUDGET BILL PROJECTIONS TO ACTUAL EXPENDITURES

The Governor's budget bill reflects the executive branch's best estimate of anticipated funding needs for the Medicaid program. Of course, a budget bill would not necessarily anticipate all policy changes in Medicaid made by the legislature. Therefore, some differences between budget bill projections and actual Medicaid expenditures is to be expected.

Analysis of budget bill submissions for the last eight years indicates that from a forecasting standpoint, budget bills have generally been accurate predictions of funding needs for the program. As shown in Table 1, comparison of budget bill submissions for the past eight fiscal years with actual expenditures for program components (excluding administrative costs) indicates the mean absolute percentage error from the eight years examined was 1.61 percent. In forecasting, it is assumed that errors will occur. The goal is to minimize the size of the errors as much as possible.

However, the amount of error that can be tolerated also depends on the consequences of the error. For example, the relatively small percentage underestimate for FY 1992 (-2.72 percent), which was addressed through budget amendments in the 1992 General Assembly session, still amounted to a shortfall of more than $39 million. In contrast, the comparably small percentage overprojection for FY 1995 (2.69 percent) resulted in an initial overallocation of approximately $55 million.

The percent errors shown in Table 1 also show that for fiscal years 1991 through 1993 there was consistent underprojection of Medicaid expenditures, while for fiscal years 1994 and 1995 there was overprojection. This pattern appears to coincide with the fact that Medicaid enrollment growth increased at rapid rates in fiscal years 1990 through 1992 (and that increases in utilization may lag enrollment growth by six to twelve months), and that the rate of enrollment growth has been declining every fiscal year from FY 1993 onward. Yet the budget bill projections were based primarily on time series models that were extrapolating from patterns in the expenditure data from past years. It is possible that the systematic pattern of underprediction and then overprediction of Medicaid expenditures could have been caused at least in part by the "turns" in the rate of Medicaid enrollment growth (first the increase and then the decrease), which could have been difficult to predict accurately when using a time series approach.

COMPARISON WITH OTHER STATE MEDICAID FORECASTS

All state Medicaid agencies, including DMAS, are required to submit quarterly forecast reports to the U. S. Health Care Financing Administration (HCFA) to project future funding needs. Using these forecasts as benchmarks (compared to actual expenditures, or the most recent expenditure estimates in the case of federal fiscal year

Table 1

Comparison of Budget Bill Projections to Actual Expenditures for Medicaid FY 1989 - FY 1996*

Fiscal Year	Budget Bill Projection■	Actual Expenditures	Percent Error
1996▲	$2,114,365,108	$2,116,567,958	-0.10
1995●	2,096,567,714	2,041,738,007	2.69
1994	1,869,131,421	1,787,649,429	4.56
1993	1,675,796,693	1,704,670,591	-1.69
1992	1,402,936,492	1,442,135,522	-2.72
1991	1,237,774,284	1,252,027,711	-1.14
1990	979,006,864	972,268,899	0.69
1989	870,793,412	864,447,024	0.73

*Excludes administrative expenditures and transfers from DMHMRSAS for mental health services.

■ Fund amounts listed in the budget bill submitted just prior to the beginning of a fiscal year were used for the analysis. For example, the budget bill submitted for the 1995 General Assembly Session provided the estimates of funding needs for FY 1996. The budget bill amounts do not include any subsequent legislative budget amendments.

▲ For FY 1996, budget bill projections reflect a six percent reduction under Executive Management Adjustments for Resizing Actions. FY 1996 actual expenditures were not available, so the most recent expenditure estimates (as of May 7, 1996) for the entire fiscal year were used instead. FY 1996 expenditure estimates exclude $18,120,736 in additional federal funds.

● FY 1995 actual expenditures reflect a subsequent six percent reduction in the Governor's budget bill made for the 1995 General Assembly session; budget bill projection shown is from the 1994 General Assembly session.

Sources: JLARC staff analysis of budget bills submitted for 1988-1995 General Assembly Sessions, and DMAS unaudited financial statements of FY 1989 - FY 1995 actual expenditures and estimates of FY 1996 expenditures as of May 7, 1996.

1996), Virginia's error rate tended to be lower than the national average error rate over the past 10 years (Table 2). In addition, Virginia's error rates on average have tended to be lower than states in its own region (HCFA Region III) and states in a neighboring region composed mostly of other southeastern states (HCFA Region IV). These error rates are first examined broadly with a single summary statistic across all years, and then examined in more detail for individual years.

The forecasts submitted to HCFA are generated entirely by DMAS and are not reviewed by other State agencies, including DPB. It is important to note that the specific forecasts shown in Table 2 are produced primarily for federal government use, and are not necessarily the same exact projections that go into the budget bill. But DMAS staff have said that these forecasts are consistent with the ones that are updated and eventually go into the DMAS budget proposal that is submitted to DPB. However, these

Table 2

Percentage Forecast Errors from Selected Quarterly Submissions to HCFA FFY 1987-1996 for Virginia, HCFA Regions III and IV, and the Nation*

Federal Fiscal Year Projected	Submission	Virginia	HCFA Region III■	HCFA Region IV▲	Nation●
FFY 1996	November 1994	2.60%	0.30%	2.36%	4.06%
	May 1995	0.17	2.21	-0.07	1.72
FFY 1995	November 1993	3.03	-0.21	4.31	4.47
	May 1994	1.55	-0.83	1.74	2.61
FFY 1994	November 1992	11.32	8.19	16.36	9.65
	May 1993	8.68	1.26	12.36	8.65
FFY 1993	November 1991	-4.70	-12.91	6.12	-1.70
	May 1992	2.62	-4.92	7.76	3.65
FFY 1992	November 1990	-2.70	-32.48	-11.08	-20.50
	May 1991	-6.44	-18.30	-0.06	-13.31
FFY 1991	November 1989	8.93	-18.51	-16.03	-17.62
	May 1990	-3.87	-15.41	-7.43	-13.55
FFY 1990	November 1988	2.62	-4.45	-6.43	-5.73
	May 1989	4.02	-2.76	-4.32	-4.39
FFY 1989	November 1987	3.36	-3.15	-3.86	-3.16
	May 1988	3.36	-2.76	-2.34	-1.49
FFY 1988	November 1986	-4.23	-6.69	-5.36	-3.16
	May 1987	3.94	-3.83	-3.93	-2.38
FFY 1987	November 1985	-6.98	-6.61	1.26	-2.71
	May 1986	-8.87	-7.49	2.02	-2.73

*Forecast errors were calculated by subtracting actual expenditures from projections and then dividing by expenditures. For FFY 1996, the most recent projections (as of February, 1996) were used.

■HCFA Region III: Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia

▲HCFA Region IV: Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee

●Nation: Aggregated forecasts and expenditures across all states and territories of the United States.

Source: HCFA, *The Waterfall Chart: Medicaid State Estimates vs. Reported Expenditures, Fiscal Years 1982-1994.*

projections do not include policy changes that are subsequently approved by the General Assembly, which may account for substantial portions of the differences between the projections and actual expenditures.

The two submissions provided for comparison are particularly important in the federal budget development process: the November submission and the May submission for the subsequent federal fiscal year. For example,the November 1995 submission and the May 1996 submission are used to develop the federal Medicaid budget for federal fiscal year (FFY) 1997. The November submission is used to develop the Medicaid portion of the President's budget. The May submission is used to update the President's budget and is typically used by the U.S. Congressional appropriations committees to set the federal Medicaid appropriation for the upcoming federal fiscal year.

Comparison of Mean Average Percent Errors

One commonly used measure of forecast error across time periods is the mean absolute percent error (MAPE). Calculating the MAPEs across all 10 federal fiscal years for Virginia, HCFA Region III, HCFA Region IV, and all states across the nation provides one perspective for comparing the overall accuracy of various states' projections with Virginia's. As shown in Table 3, among the November submissions, Virginia's MAPE is substantially lower than that of HCFA Regions III and IV, and is slightly lower than that of all states in the nation. Similarly, among the May submissions, Virginia's MAPE is slightly lower than those of HCFA Region III and all states in the nation, and is only

Table 3

Mean Absolute Percent Errors (MAPEs) from FFY 1989-1996 for Virginia, HCFA Regions III and IV, and the Nation*

Submission	Virginia	HCFA Region III■	HCFA Region IV▲	Nation●
November	5.05	9.35	7.32	7.28
May	4.35	5.98	4.20	5.49

*Forecast errors were calculated by subtracting actual expenditures from projections and then dividing by expenditures.

■ HCFA Region III: Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia

▲ HCFA Region IV: Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee

● Nation: Aggregated forecasts and expenditures across all states and territories of the United States.

Source: JLARC staff analysis of data from HCFA, *The Waterfall Chart: Medicaid State Estimates vs. Reported Expenditures, Fiscal Years 1982-1994.*

slightly greater than the average MAPE of HCFA Region IV. Overall, these findings indicate that across the last 10 years, Virginia's Medicaid forecasts submitted to HCFA have tended to be slightly more accurate on average than those of most other states.

Comparison of Percent Errors for Individual Fiscal Years

Another perspective on Virginia's forecast performance is a year-by-year comparison. Distinct patterns appear to emerge from three periods in time: FFY 1994 - 1996, FFY 1991 - 1993, and FFY 1990 and earlier.

Overprojection in FFY 1994 - 1996. Virginia overprojected FFY 1994 - 1996 expenditures, and other states in HCFA Regions III and IV and across the nation tended to as well. Virginia also overprojected for FY 1994 -1995 in the budget bill, as shown in Table 1 (although Virginia's fiscal year is from July 1 to June 30, when the federal fiscal year is from October 1 to September 30). In terms of magnitude, Virginia's percent error tended to be much higher compared to HCFA Region III states on average. But at the same time it tended to be lower more frequently compared to HCFA Region IV states and all states across the nation on average.

Underprojection in FFY 1991 - FFY 1993. Not only did underprojection tend to occur in Virginia for fiscal years 1991 - 1993, but in other states as well. In fact, the magnitude of error in Virginia's underprojections generally tended to be much lower than those of other states. This pattern indicates that, from the federal government's perspective as a Medicaid payer, Virginia's shortfalls were not as severe as those of most other states in those fiscal years.

Mixed Performance in FFY 1990 and Earlier. Virginia's forecasts for FFY 1990 and earlier appeared to perform with roughly the same degree of accuracy as other states' forecasts. The magnitude of Virginia's percent errors tended to be greater more of the time compared to those of other states in HCFA Region III and across the nation. When compared to the states in HCFA Region IV, however, the magnitude of Virginia's percent errors were larger and smaller an equal number of times.

A major difference worth noting during this time period, however, is that the other states on average almost always underestimated their expenditures. At the same time, Virginia overprojected a bit more frequently than underprojected. Consequently, from HCFA's perspective, Virginia did not experience shortfalls during these years nearly as frequently as the other states.

COMPARISON OF DMAS AND DPB FORECASTS

Forecasts generated by DMAS and DPB were compared with subsequent information on actual Medicaid expenditures in FY 1995 and FY 1996 (see Tables 4 and 5, respectively). The forecasts generated by the two agencies were developed at about the

Table 4

DMAS and DPB Projections of FY 1995 Medicaid Expenditures

Service Category	DMAS Projections			DPB Projections	
	Actual Expenditures	Dollar Amount	Pct. Diff. from Actual	Dollar Amount	Pct. Diff. from Actual
Inpatient Hospital	$533,424,110	$527,873,547	-1.04%	$526,900,000	-1.22%
Outpatient Hospital	122,262,477	129,542,823	5.95%	127,800,000	4.53%
Nursing Facilities	387,325,563	395,694,788	2.16%	398,400,000	2.86%
Physician Services	217,544,800	234,387,852	7.74%	230,900,000	6.14%
Pharmacy Services	179,085,847	186,651,227	4.22%	166,900,000	-6.80%
Managed Care	16,325,818	N/A	N/A	N/A	N/A
All Other	322,051,010	332,994,753	3.40%	340,700,000	5.79%
Other long-term care	82,093,987	80,922,582	-1.43%		
Medicare premiums	59,227,513	66,467,455	12.22%		
Mental illness services	27,164,462	27,969,162	2.96%		
Remaining "other"	153,565,048	157,635,554	2.65%		
TOTAL MEDICAL SERVICES	1,778,019,625	1,807,144,990	1.64%	1,791,600,000	0.76%

Note: Forecasts as of November 1994.

Sources: DMAS, *General Medicaid and Mental Illness Services Forecast Report: April, 1996*; DPB, *Indigent Demand for Health Care in Virginia: An Econometric Approach to Medicaid Forecasting*, 1996.

same time, so the same expenditure data were available. Further, the forecasts shown in Table 4 were for FY 1995 and were generated around November 1994, or about one-third of the way into that fiscal year. Likewise, the forecasts shown in Table 5 were for FY 1996 and were generated around November 1995, again about one-third of the way into the fiscal year. Therefore, it is not surprising that the percent errors of these forecasts would be smaller than those from the budget bill projections (shown in Table 1): the budget bill projections tended to be done about eight months before the start of the fiscal year forecasted, rather than four months after the start (when four months of actual expenditure data for that year may be available and incorporated into the projection).

When comparing the DMAS and the DPB forecasts, some differences can be readily observed. One is that the expenditure categories being forecasted may not be exactly the same. For example, DMAS staff have separate forecast numbers for "other long-term care" and "Medicare premiums," when DPB staff include these subcategories in their "All other" category.

Other differences can be observed in terms of the subsequent performance of the forecasts. In aggregate, the DPB projections appear to be more accurate for FY 1995 (0.76 percent difference from actual expenditures, compared to DMAS projections having a difference of 1.64 percent), and for FY 1996 (2.38 percent difference, compared to DMAS

Table 5

DMAS and DPB Projections of FY 1996 Expenditures

Service Category	YTD Actual Expenditures*	Annualized YTD Expenditures**	DMAS Projections Dollar Amount	DMAS Projections Pct. Diff. from Actual	DPB Projections Dollar Amount	DPB Projections Pct. Diff from Actual
Inpatient Hospital	$413,708,903	$496,450,684	$501,450,830	1.01%	$491,000,000	-1.10%
Outpatient Hospital	91,198,022	109,437,626	113,192,508	3.43%	108,500,000	-0.86%
Nursing Facilities	328,975,912	394,771,094	398,890,670	1.04%	398,100,000	0.84%
Physician Services	151,636,886	181,964,263	182,084,852	0.07%	155,200,000	-14.71%
Pharmacy Services	141,870,777	170,244,932	175,323,993	2.98%	147,900,000	-13.13%
Managed Care	113,601,892	145,003,104	170,463,610	17.56%	170,500,000	17.58%
All Other	279,941,435	335,929,722	352,989,329	5.08%	406,200,000	20.92%
Other long-term care	78,148,617	93,778,340	94,629,660	0.91%		
Medicare premiums	57,589,262	69,107,114	74,369,340	7.61%		
Mental illness services	24,796,967	29,756,360	34,065,761	14.48%		
Remaining "other"	119,406,589	143,3287907	149,924,568	4.63%		
TOTAL MEDICAL SERVICES	1,520,933,827	1,833,801,426	1,894,395,792	3.30%	1,877,400,000	2.38%

Note. Forecasts as of November 1995.

*Actual Year-to-Date Medicaid expenditures as of April 30, 1996.

**Annualized Year-to-Date Medicaid expenditures were calculated by adding to YTD actual expenditures the average monthly expenditures as proxies for May and June 1996 expenditures. Capitation payments for the Medallion II program became effective in January 1996, so average monthly expenditures of $15,700,606 were used as proxies for managed care expenditures in May and June 1996. This benchmark is used as a rough estimate of actual expenditures, rather than adding May or June estimates from DMAS or DPB which may be closer to final actual expenditures, in order to reduce potential bias when comparing the performance of DMAS projections and DPB projections.

Sources: DMAS, *General Medicaid and Mental Illness Services Forecast Report: April, 1996*; DMAS, *Forecast Comparisons*, 1996; DPB, *Medicaid Forecast*, November 1995.

projections' difference of 3.30 percent). However, when examining the projections for individual expenditure categories, a more complicated picture emerges. In some categories, the DPB projections appear to be more accurate, and in others, the DMAS projections appear to be more accurate. Overall, however, the DPB projections generally appear to differ by larger percentages from the actual expenditure estimates, especially for FY 1996. This apparent anomaly may be due in part to the DPB projections using different groupings of expenditure subcategories than those used by DMAS (when the actual expenditure estimates are reported by DMAS). Further, in the DPB econometric model, estimates in one category (such as managed care) are related to estimates in other categories (such as physician or pharmacy services). Therefore, there may be some systematic reason that a large overprojection in one category is offset in part by large underprojections in other categories. On the other hand, these kinds of systematic relationships between estimates of individual categories may not yet be fully understood. If these larger errors do indeed happen to cancel out due to coincidence more than to

systematic differences in how subcategories are grouped or related, then it would be risky to assume that the errors would also tend to cancel out in a similar way in future years.

The DMAS and DPB forecasts diverge more as the forecast horizon is extended. Tables 4 and 5 show that the difference between the DMAS and DPB forecasts of total medical costs for Medicaid is approximately $16 million and $52 million for FY 1995 and FY 1996, respectively. However, DMAS and DPB forecasts as of November 1995 diverge by $77 million for FY 1997 and $156 million for FY 1998, according to a DPB comparison.

Other longer-range forecasts made by DMAS and DPB also show similar patterns of divergence as well. For example, Table 6 shows longer-range forecasts made by DMAS and DPB of "Total General Medicaid" expenditures (which constitute approximately 85 percent of the "Total Medical Services" expenditures shown in Tables 4 and 5). In January 1994, DMAS made forecasts of these Medicaid expenditures for the upcoming fiscal years 1995 and 1996. Similarly, DPB made corresponding forecasts in February 1994. Although these two sets of forecasts were not made at the same exact point in time, they were close enough to be comparable.

Two types of differences are worth noting when comparing the forecasts. One is the divergence between the DMAS and DPB forecast as the forecast horizon becomes longer. For FY 1995, the difference between the two sets of forecasts was approximately $49 million; for FY 1996 it was approximately $101 million. Another type of contrast is in the percent differences between the forecasts and the actual expenditures (or, in the case of FY 1996, actual expenditures for the first 10 months and most recent estimates

Table 6

DMAS and DPB Longer-Range Projections of Total General Medicaid Expenditures

Fiscal Year	Actual Expenditures or Most Recent Estimates	*DMAS Projections*		*DPB Projections*	
		Dollar Amount	Pct. Diff. from Actual	Dollar Amount	Pct. Diff. from Actual
1995*	1,750,855,162	1,823,914,146	4.17%	1,774,900,000	1.37%
1996**	1,821,474,832	1,980,168,288	8.71%	1,879,400,000	3.18%

Note: DMAS forecasts as of January 1994, DPB forecasts as of February 1994.

*Actual expenditures for FY 1995.

**For FY 1996, most recent estimate of annual Medicaid expenditures as of May 7, 1996 (including actual expenditures from July 1, 1995 to April 30, 1996 and most recent DMAS projections for May and June 1996 expenditures).

Sources: DMAS, *General Medicaid Forecast*, January 1994; DMAS, *General Medicaid and Mental Illness Services Forecast Report: May, 1996*; DPB, *Medicaid Expenditure Forecast*, February 1994.

for the remaining two months). In both fiscal years, the DPB forecasts were lower, and consequently closer to the actual expenditures, compared to the DMAS forecasts.

These patterns of divergence underscore the need, especially at times when Medicaid expenditure growth patterns are changing, to have multiple forecasts using multiple approaches and methods. In this way, there is increased scrutiny and oversight of projections made for the program. Further, multiple forecasts may provide a better sense of the magnitude of error to expect in the projections, especially during times of program change.

IV. Adequacy of Forecast Models and Process

The mandate for this study specifies that JLARC "shall make recommendations regarding the soundness and usefulness of the methodology [used to forecast Medicaid expenditures] for decision-making." To address this part of the study mandate, the soundness and usefulness of DMAS and DPB approaches to forecasting Medicaid expenditures were assessed, using key criteria developed in past JLARC studies for evaluating the adequacy of forecast models and the forecasting process. After assessing the forecast models explicitly in terms of one set of criteria, the advantages and disadvantages of the different forecast methods are examined. Then, after evaluating the forecast process explicitly in terms of another set of criteria, some conclusions are drawn and recommendations are made for improving the process.

The key findings of this chapter can be summarized by two points. First, the forecast modeling itself appears to have improved considerably since the last time JLARC examined it in 1992. Second, the process for selecting a final forecast among competing forecasts needs improvement, however, especially if legislative committees are to be adequately informed of projected Medicaid expenditures a month before the Governor's budget bill is to be submitted to the General Assembly.

ASSESSMENT OF FORECAST MODELS

The forecast modeling approaches that both DMAS and DPB currently take have shown much improvement and development since the last JLARC review of Medicaid forecasting in 1992. DMAS now uses more extensively an approach in which the number of units and cost-per-units are forecasted using separate models. This improvement allows for more explicit inclusion of certain types of policy changes in the models. Further, DMAS has developed and is implementing a method of adjusting its exponential smoothing models explicitly for certain types of policy changes, which was still under development at the time of the last JLARC review.

On the other hand, DPB has taken a totally different approach in how it models Medicaid expenditures. At the time of the last JLARC review, DPB was using ARIMA models (another form of univariate time-series models) as a check on DMAS exponential smoothing models for forecasting Medicaid expenditures. Since then, DPB staff saw the potential usefulness of a more distinct approach to predicting Medicaid expenditures rather than generating another version of univariate time-series analysis. As a result, DPB staff developed regression models which could utilize information (such as expected future demographic trends) that may not be readily captured using a time-series approach (which focuses exclusively on patterns observed in past data).

Overall, both DMAS and DPB modeling approaches meet most of the criteria for evaluating forecast models. However, each approach has its advantages and its disadvantages. Consequently, generating forecasts using both approaches builds on the

strengths of each in a complementary fashion. The choice of a final forecast does not necessarily mean that one approach has to be chosen exclusively over the other — the two can be combined when both appear to be technically sound.

Criteria for Evaluating Forecast Models

Six criteria were used for evaluating the DMAS and the DPB forecast models and their administration (Exhibit 3). The criteria are the same as those used in the 1992 JLARC study. The DMAS models appear to conform substantially with five of the six criteria (criteria 1, 2, 4, 5, and 6), while questions arise concerning how the model parameters are derived and how frequently they may be adjusted (criterion 3). Similarly,

Exhibit 3

Criteria for Evaluating Forecast Models and their Administration

	Current DMAS Models	Current DPB Models
1. Model assumptions are clearly understood by participants and periodically reviewed.	✔	✔
2. Variables used in models' equations are sufficient, accurately measured, and the best information available at the time.	✔	✔
3. Equations are mathematically sound and tested to ensure mathematical precision.	?	✔
4. Different regional conditions are taken into account sufficiently.	✔	✔
5. Forecast errors are analyzed on an ongoing basis.	✔	?
6. Forecast models are reviewed and documented well, including any judgmental or policy adjustments.	✔	✔

Key
✔ Meets criterion
X Does not meet criterion.
? Question concerning whether fully meets criterion

Source: Criteria from *Interim Report: Review of the Virginia Medicaid Program*, JLARC 1992.

the DPB models appear to conform substantially with five of the six criteria (criteria 1, 2, 3, 4, and 6), with questions arising with regard to the analysis of forecast errors (criterion 5).

DMAS Models. Interviews with DMAS budget staff and review of model documentation indicate a clear understanding of the assumptions built into the model (criterion 1). In choosing to use exponential smoothing models, DMAS budget staff had explicitly chosen a forecasting technique that does not require as much training in quantitative analysis as would more sophisticated techniques (such as ARIMA or regression modeling), yet that tends to be as reliable and accurate as the more sophisticated techniques, according to forecasting literature. In other words, exponential smoothing is a relatively simpler technique, so there are fewer model assumptions that may be violated or misunderstood in their application. The main assumption of exponential smoothing is that one observation in a time series is likely to help predict the next. DMAS staff appear to have a clear understanding of when this assumption is valid and when it may not be valid, by cross-checking expenditure category forecasts with actual data when it comes in, and with other models.

The DMAS forecast models now appear to meet the criterion related to the sufficiency, accuracy, and adequacy of the variables used in forecast model equations (criterion 2). In the 1992 JLARC review, the DMAS forecast models did not appear to fully conform with this criterion. At that time, it appeared difficult to distinguish the effects of inflation, anticipated rate changes, and utilization on past expenditure data, when many of the forecast models were based on total costs rather than separately modeling the number of units and cost-per-unit for each expenditure category. Now that DMAS budget staff use unit-based forecasts, and have developed techniques for adjusting their exponential smoothing models for anticipated policy changes, this problem appears to have diminished.

There are questions regarding whether the DMAS model equations are mathematically sound over time and tested periodically to ensure mathematical precision (criterion 3). Although there is no evidence that the models are unsound, these questions focus in particular on how stable the parameters in the exponential smoothing models are over time, and how often they are re-evaluated and re-estimated when necessary.

According to DMAS staff, all model parameters were determined when the current forecast reporting system was established in 1995. DMAS staff said they examined about five or six alternative sets of parameters for each model before selecting the final set based on diagnostic statistics and judgment. Further, rather than adding new data to existing models and using results that are produced without a guiding rationale, DMAS staff appear to check the forecasts at least every quarter, although they try not to change the parameters too frequently. But if, for example, a DMAS budget analyst sees that a forecast differs greatly from actual expenditures when they come in, or if the forecasted values have been changing substantially for more than four times in a row (as forecasts are updated approximately once each month), then the analyst is expected to take further action. The analyst is expected to consult DMAS operations staff

responsible for that particular program, to determine the possible reasons for the unexpected pattern, and to adjust the forecast model accordingly.

However, DMAS staff indicate that the model parameters are re-examined only if problems are perceived to develop. This practice may reduce staff time required to maintain the models, but it has at least two risks. One is that problems resulting from model parameters being obsolete may not be readily apparent until many accumulate and create a crisis situation. Another risk is that the definition of a "problem" may be a subjective judgment call, so that the same discrepancies in the forecasts may be considered "problems" at one point in time but not at another (such as a period when DMAS budget staff are preoccupied with deadlines in the budgeting process). An alternative practice of systematically re-evaluating all model parameters at regular times in the year, and more systematically defining a "problem" situation that may warrant re-estimating model parameters, may reduce these risks.

The DMAS models appear to take regional conditions into account sufficiently (criterion 4). Although regional conditions are not explicitly considered in the forecast models, differences are implicitly accounted for in the model. For institutional providers, for example, the expenditure data used in the forecast reflect reimbursement rates based in part on individual provider cost reports. Therefore, if an institutional provider in Northern Virginia has higher costs, these costs are accounted for in its reimbursement rate and the expenditures for that facility. Further, some programs that are accounted for separately are located in specific regions of the State, such as the managed care program in the Tidewater region.

DMAS staff appear to analyze forecast errors on an ongoing basis (criterion 5). Each time a forecast for a given expenditure category is generated or updated (generally once each month), a "Forecast Report Summary" is generated. This periodic report includes, on the last two pages, measures of the differences between forecasted values and actual values for the various forecast components (such as number of units, costs per unit, add/pays and remittances) and the total expenditure category forecast. As already mentioned, DMAS staff have said that they regularly review these differences to detect whether any changes in the expenditure category programs are occurring beyond those already expected.

Criterion 6 requires that forecast models be reviewed and documented, including any judgmental or policy adjustments. The DMAS "Forecast Summary Reports" provide extensive documentation of the baseline forecast models, including parameter values, diagnostic statistics, graphics comparing historical data and forecasted output, and indicators of forecast error. Adjustments for the anticipated effects of policy changes or judgmental adjustments made to the baseline components also are included in part in these reports. DMAS staff have developed procedures for documenting judgmental inputs or adjustments for policy changes.

Recommendation (1). **The Department of Medical Assistance Services should periodically and systematically re-evaluate all exponential smoothing**

model parameters, and define systematically the conditions warranting re-estimation of the model parameters.

DPB Models. DPB staff appear to have a clear understanding of their model assumptions (criterion 1). The model assumptions are stated in the 1996 DPB document, *Indigent Demand for Health Care in Virginia: An Econometric Approach to Medicaid Forecasting*. This document states the rationale for choosing an econometric approach and discusses the theoretical framework for the model.

Variables used in the DPB models' equations overall appear to be sufficient, accurately measured, and the best information available at the time (criterion 2), although the regression equations in the econometric model appear to be under development still. For example, there are two equations for predicting inpatient costs for the aged, which appear to be redundant. DPB staff indicate that both equations are in the model because they are not entirely satisfied with either equation's performance.

This situation may be a reflection of a broader concern with regression models in general: whether there is some missing independent variable that would result in more accurate predictions. Although JLARC staff see no clear cases of misspecification in the econometric model, the exploration of possibilities for other meaningful predictor variables does not appear to be exhausted at this point. Therefore, further exploration of additional potential predictor variables appears warranted as the model is further developed.

DPB staff re-evaluate the variables to include in the models twice each year. This re-evaluation includes an examination of theoretical or logical relationships between variables, and then statistical tests of potential variables considered for inclusion in the models.

Criterion 3 requires that the equations are mathematically sound and tested to ensure mathematical precision. The DPB approach appears to meet this criterion. The econometric model specification and selected statistics are shown in the DPB document, *Indigent Demand for Health Care in Virginia*. The time series analysis appears mathematically sound from the examples shown in the document, but the statistics demonstrating the mathematical soundness of the remaining time series analysis components are shown in separate printouts that are maintained by DPB staff.

The DPB forecasts appear to take different regional conditions into account sufficiently (criterion 4). For example, in forecasting inpatient hospital costs, the DPB time series forecasts disaggregated the data geographically among two regions of Virginia: Tidewater and the rest of the State. This disaggregation was done to reflect the expansion of managed care in the Tidewater region. Further, the regression equations from the econometric model could be readily adapted to take regional differences into account, if necessary.

It is unclear how systematically and regularly DPB forecasters have analyzed errors of their models on an ongoing basis (criterion 5). The DPB Health and Human

Resources section currently monitors how closely budgeted amounts for Medicaid match actual expenditures on an ongoing basis. Further, DPB Economic and Regulatory Analysis section staff have plans to generate quarterly tracking reports of the accuracy of the latest DPB and DMAS forecasts available at the time of completion of the budget bill. But this proposed tracking system has not yet been implemented.

The DPB models appear to meet criterion 6 for the most part, which requires that forecast models are reviewed and documented well. Documentation should include any judgmental or policy adjustments, although DPB staff have indicated that they do not make as many explicit adjustments for policy changes as do DMAS staff in their forecasts. The DPB document *Indigent Demand for Health Care in Virginia* provides a broad, comprehensive picture of the DPB econometric model and the DPB time series analysis, as well as the rationale behind the DPB approach. Although this document is a good basis for an overall understanding of the DPB forecasting approach, it does not contain all of the details of the forecast models used and their components. To supplement this broader level of documentation, DPB staff also maintain files of printouts containing more detailed information about the forecasts and the models.

Advantages and Disadvantages of DMAS and DPB Forecasting Approaches

Although the forecast models administered by DMAS and DPB appear to be technically sound, each approach has its own strengths and weaknesses. In interviews with DMAS and DPB staff, several advantages and disadvantages with the two forecasting approaches were identified. The various advantages and disadvantages shown in Exhibits 4 and 5 illustrate the need for using multiple approaches to forecast Medicaid expenditures. As shown in the two exhibits, areas of weakness in one approach may be areas of strength in the other, and vice versa.

One way of characterizing the complementary nature of the two approaches is in terms of the "bottom-up" nature of the exponential smoothing approach used by DMAS, and the "top-down" nature of the econometric modeling approach used by DPB. The "bottom-up" nature refers to DMAS staff beginning with many specific components of Medicaid expenditures, modeling them separately, and then combining them to create forecasts of subcategories of expenditures, which then are combined into broader categories of expenditures. The "top-down" nature refers to DPB staff starting out modeling broader categories of Medicaid expenditures, and disaggregating when necessary.

Both the "bottom-up" approach and the "top-down" approach are alternative ways for predicting Medicaid costs in future years. When they converge, they can enhance confidence in the forecast by corroborating each other. When they diverge, they provide a warning against having a false sense of certainty in any one set of projections, and can also provide some sense of the possible range in which future expenditures may fall. The forecasting literature in recent years has produced several studies showing that combining projections from multiple methods can produce consistently more accurate forecasts.

Exhibit 4

Advantages and Disadvantages of DMAS Forecast Approach

Advantages

- Can update forecasts frequently.
- Tracks Medicaid expenditures systematically, can detect when patterns change.
- When changes are detected, DMAS budget staff can consult DMAS operations staff easily to determine source of change.
- Uses "bottom-up" approach: Expenditure categories and models are broken down to very detailed level, so specific policy changes can be related to specific parts of forecast.
- DMAS forecasts can also be reported to HCFA (which has its own requirements for expenditure projections).
- Analysts need less training and resources, because much expertise is built into automated system in place.
- Analysts need not worry about theoretical assumptions of models being violated.

Disadvantages

- Mental health programs (such as those at DMHMRSAS facilities) should get more scrutiny.
- No direct link in DMAS forecasts with expected population trends or other causal factors.
- Difficult to keep up with changes in trends and to change model parameters with 159 models.
- Exponential smoothing models cannot take into account causal factors explicitly.

Source: JLARC staff analysis of interviews with DMAS and DPB staff.

Another advantage to having both DMAS and DPB produce separate forecasts is that each can be tailored more to the relative strengths that each set of agency staff can bring to the forecasting process. DMAS budget staff by organizational and physical proximity have more access to DMAS operations staff for consultation and collaboration. Having forecast models more disaggregated along program lines can facilitate this collaboration, as well as quarterly reporting to HCFA (which is required of DMAS but not of DPB).

DPB Economic and Regulatory section staff, on the other hand, have responsibilities not only for forecasting Medicaid expenditures, but also for producing forecasts

Exhibit 5

Advantages and Disadvantages of DPB Forecast Approach

Advantages

- Causal modeling allows forecast to use additional information known in advance, besides past expenditure data.
- May provide more accurate forecasts when major changes occur in Medicaid program, when sources of change are included explicitly in regression equations.
- Allows more understanding of why changes occur, increases explanatory power.
- Coefficients from regression equations can be used to estimate impacts of policy changes.
- Requires analysts to take alternative look at Medicaid expenditure data.
- Provides "top-down" alternative approach for comparison with DMAS forecasts (based on "bottom-up" approach).

Disadvantages

- Requires relatively higher level of staff training and time.
- Expenditure categories used do not appear to be as comparable with DMAS or HCFA categories as they could be.
- No separate managed care or mental health service expenditure estimates are made.

Source: JLARC staff analysis of interviews with DMAS and DPB staff.

in other functional areas of government, and for analyzing the impacts of changes of regulations (including Medicaid regulations) in all functional areas of government. Consequently, DPB staff in this section are exposed to a wider range of forecasting problems and are perhaps more free to try out alternative ways of generating forecast models. Further, results from their models may also be used for analyzing the impacts of changes in policies or regulations — duties which may not be required as much of DMAS budget staff.

The choice of a final forecast for the budget bill does not have to be an "either-or" choice between the DMAS forecast and the DPB forecast. When two competing sets of forecasts are both technically sound and yet have diverging predictions, and when one set is not clearly technically superior to the other in all ways, it is common practice among

forecasters to combine the two sets of forecasts. A common method of combining multiple forecasts is to take an average of their predictions. Making such a choice, however, may go beyond strictly technical considerations, and may be more a function of the forecasting process.

ASSESSMENT OF FORECASTING PROCESS

The overall forecasting process, from the inception of the forecasts at DMAS and DPB to the inclusion of a final forecast in the budget bill, was assessed against the five criteria used in the 1992 JLARC study (Exhibit 6). The assessment indicated the process fully meets one (criterion 4) of the five criteria. However, there are questions concerning whether three are met under the current process (criteria 1, 2 and 3), and one (criterion 5) does not appear to have been met in recent years.

Exhibit 6

Criteria for Evaluating Forecasting Processes

	Current Virginia Process
1. The degree of uncertainty associated with forecasts should be understood by process participants.	?
2. The agency making forecasts should have the data and personnel required to generate a good estimate.	?
3. Regular reports on actual expenditures and their variance from forecasts should be developed and available to agency staff and interested external participants, as appropriate.	?
4. The process should maintain the flexibility to respond to dramatic changes in recipient utilization and program expenditures by revising the forecasts.	✔
5. The process should include a mechanism requiring some level of expanded review of the forecasts.	X

Key

✔ Meets criterion

X Does not meet criterion.

? Question concerning whether fully meets criterion

Source: Criteria from *Interim Report: Review of the Virginia Medicaid Program*, JLARC 1992.

Criterion 1: Understanding Uncertainty in Forecasts

Criterion 1 is that the degree of uncertainty associated with the forecasts should be understood by process participants. Interviews with DMAS and DPB staff who generate the forecasts indicate that they are cognizant of the potential weaknesses of the forecast methodologies. However, once the forecasts are passed on to decision-makers who would select a final forecast from competing forecasts for preparing the Governor's budget bill, it is unclear how well the decision-makers have understood the uncertainty associated with the forecasts.

Criterion 2: Personnel and Data

Criterion 2 requires that the agency making each forecast should have the data and personnel required to generate a good estimate. The DMAS budget section appears to have the resources to produce a good estimate in a timely fashion. It is not so clear whether the DPB Economic and Regulatory Analysis section had adequate personnel to produce a good estimate in the timeframe required by the Appropriation Acts of 1995 and 1996.

The DMAS budget section currently has six analysts assigned to different Medicaid program areas. Each analyst is responsible for maintaining a subset of the 159 forecast models that are relevant to his or her area, monitoring relevant expenditures and program changes, and other duties associated with budget preparation. Further, each analyst appears to consistently update and monitor the forecast models on a year-round basis. Consequently, DMAS appears to have adequate staffing to meet the earlier reporting deadlines required by the recent Appropriation Acts.

In contrast, DPB staff reported that currently two analysts are allocating approximately one-quarter of their time to forecasting Medicaid expenditures. Because they have duties for generating other unrelated forecasts and regulatory analyses as well, DPB staff stated that they cannot easily re-generate and update their Medicaid forecasts consistently on a year-round basis. Currently, they maintain "cycles" throughout the year in which they focus their attention on particular areas at particular times. According to DPB staff, moving up their Medicaid forecasting process by a few weeks, for example, may interfere with the time they can allocate to inmate population forecasting. Therefore, it appears uncertain whether current DPB staffing is adequate to generate earlier forecasts to meet the reporting deadlines required by the Appropriation Act.

Criterion 3: Regular, Periodic Reporting of Differences

According to criterion 3, regular reports on actual expenditures and their variance from forecasts should be developed and available to agency staff and interested external participants, as appropriate. DMAS staff regularly generate Forecast Reports which appear to meet this criterion. These reports summarize (for the most recently completed fiscal year, the current fiscal year, and two future fiscal years) the most recent

forecasts, previous forecasts, allocations or base budgets, actual expenditures (for the completed fiscal year), and variances between these sets of numbers. Further, DMAS staff have the capability to generate on request other reports tracking forecasts and actual expenditures.

As already mentioned, DPB staff report they are in the process of developing an automated system for quarterly tracking of how closely DPB and DMAS forecasts used in the budget bill match subsequent actual expenditures in the subsequent biennium. This new tracking system was requested by the Secretary of Finance. This plan for matching forecasts to actual expenditures appears to outline a course of action that would meet criterion 3. But it has not yet been implemented. In terms of what already has been implemented, DPB staff do discuss model accuracy in their 1996 document, *Indigent Demand for Health Care*. But up to now, there appears to have been little of the kind of regular, periodic tracking of DPB forecasts sustained over time that would meet criterion 3.

Criterion 4: Ability to Respond to Dramatic Changes

The current forecast process appears to be sufficiently flexible to respond to dramatic changes in program expenditures (criterion 4). DMAS budget staff reported that they are monitoring expenditures on a regular basis, and that they revise their forecasts when they observe dramatic changes occurring. DPB staff indicated that their econometric models were designed to anticipate more explicitly future dramatic changes, compared to a time series analysis.

Criterion 5: Expanded Review of Forecasts

The process implemented in the past couple of years does not appear to include a well-coordinated mechanism for expanded review of the forecasts (criterion 5), as there may have been in the past. For example, at the time of the 1992 JLARC study, a mechanism that was under development was a forecast review panel to review the methods used in the DMAS forecast. The panel consisted of both DMAS deputy directors, the DMAS budget division director, the policy division director, the fiscal division director, and a representative from DPB. According to the former DMAS budget director, meetings typically dealt with technical aspects of forecasting major components of the Medicaid program. Since that time, this particular process has been discontinued.

In contrast, the forecast process of more recent years can be characterized as more insular. DMAS first generates its Medicaid expenditure forecast for the Medicaid budget proposal that is submitted to DPB, with relatively little collaboration with DPB staff in the meantime. Then DPB generates its own Medicaid expenditure forecast, with relatively little collaboration with DMAS staff. Once the DPB forecast numbers (as well as DMAS forecasts) are submitted to persons higher in the administration, then neither DMAS nor DPB forecasters would have any involvement in deciding what the final forecast for inclusion in the budget bill would be.

There are at least two ways in which the current forecast process has recently shown weakness. One was that legislators did not receive all of the forecast information they were expecting approximately one month before receiving the budget bill. The other was not having an effective mechanism for an expanded review of the forecasts, despite increasing legislative concern regarding Medicaid expenditure forecasts.

Expected Forecast Information for Legislative Review Not Received. The General Assembly in recent years has seen Medicaid expenditures expand to the point where they are now approximately 14.8 percent of the general fund budget (as of FY 1996). Consequently, in the Appropriation Acts of 1995 and 1996, the General Assembly has requested that legislators be briefed regarding projected Medicaid expenditures a month before submission of the Governor's budget bill. In this way, legislators can better plan for this sizable portion of the general fund budget, when considering other appropriations to make as well.

It is not unusual for legislators or their staff to be briefed or to participate in choices regarding key forecasts, well in advance of submission of the budget bill. For example, with regard to the State's revenue forecasts, several legislators are included as members of the Governor's Advisory Council of Revenue Estimates, which is briefed and asked to comment upon upcoming revenue projections each November. As another example, legislative staff are included in building a consensus forecast on future inmate populations in the State, prior to deadlines normally occurring in October or November of each year.

However, when DPB staff briefed legislators regarding Medicaid expenditure forecasts on November 17, 1995, they presented the DMAS forecasts but not the DPB forecasts. As already mentioned, DPB staff indicated in interviews with JLARC staff that their forecasts had not been completed and were not ready for presentation at that time. Consequently, legislators were given one set of forecasts, but were not fully informed in November that the DPB estimate of anticipated funding needs for the Medicaid program might be the final estimate used in the budget bill. Subsequently, the DPB forecasts instead of the DMAS forecasts in fact served as the basis of Medicaid projections for the budget bill submitted just one month later. As a result, the legislative planning process was based on a forecast that turned out to be an inaccurate representation of the final forecast chosen by the administration. This misperception could have been prevented had DPB staff generated their own forecasts, and had administration officials chosen the basis for the final forecast, in time to meet the November 15 deadline.

The November 15 deadline for reporting the Medicaid forecasts to be used in formulating the budget bill is currently in the Appropriation Act of 1996. This provision will be superseded by future Appropriation Acts, meaning that the November 15 deadline for all forecasts will not have the force of law unless it continues to be included in every future Appropriation Act. Alternatively, if the General Assembly wishes to maintain early reporting of all Medicaid forecasts as an ongoing practice, it could amend Seciton 32.1-323.1 of the *Code of Virginia* to require a November 15 reporting deadline for the DPB forecasts as well as for the DMAS forecasts. Ongoing reporting deadlines for other forecasts (such as for revenues or inmate populations) are already in statute as well.

Recommendation (2). **The Department of Planning and Budget should be prepared to report its forecasts, as well as those generated by the Department of Medical Assistance Services, when it reports to the Chairmen of the House Appropriations and Senate Finance Committees by November 15 of each year, as required by the 1996 Appropriation Act. Further, the department should be prepared to report the basis of the final forecast to be chosen by November 15.**

Recommendation (3). **The General Assembly may wish to amend Section 32.1-323.1 of the*Code of Virginia* to apply the November 15 deadline to the Department of Planning and Budget Medicaid forecasts, as well as those generated by the Department of Medical Assistance Services, if it wishes to maintain early reporting of all Medicaid forecasts as an ongoing practice.**

Expanded Review of Forecasts. The broader problem with the current process concerns how the forecasts are reviewed, and how a final forecast is chosen. The forecasting literature demonstrates that an expanded review of a forecast, which invites scrutiny from different perspectives, can help ensure that a forecast is as free from bias as possible. In contrast, selection of the final Medicaid forecast in recent years appears to have been restricted to a relatively narrow group of individuals, despite efforts of the General Assembly in recent years to review the forecasts sooner.

Mechanisms in the process for ensuring that the final Medicaid forecast is free from bias did not appear to be in place in recent years. Several meaningful and credible mechanisms are available, and some are already being used by the State for other forecasts. These mechanisms can be grouped into three categories: (1) consensus-building process within the executive branch; (2) consensus process including legislative staff; and (3) consensus process including legislators. Examples of these mechanisms can already be found in the *Code of Virginia*.

Something resembling a consensus-building process within the executive branch for the Medicaid forecast appears to have existed in the past. In this process, different agency staff would present their alternative forecasts, and discussion of the forecasts would include analysts generating the forecasts as well as others involved in budgeting or operations. A mechanism to facilitate this type of interaction and information exchange could be a forecast review panel. Such a panel for reviewing the Medicaid forecasts should include DMAS staff (from operations as well as budget sections), DPB staff (including budget analysts as well as forecasters), DMHMRSAS staff, and appropriate representatives from the Governor's cabinet, including appropriate representatives from the Office of the Secretary of Health and Human Resources. Outside experts on forecasting could be included as well.

Another method for reviewing a forecast is to extend the consensus-building process beyond the executive branch, by including representatives from the legislative branch. One possible mechanism would be to extend the review panel outlined above to include legislative staff. This type of committee is currently used in generating and selecting the State's annual inmate population forecasts. A variation of this type of

mechanism is to have two committees: (1) a technical committee to focus on the statistics and modeling, and (2) a policy committee to review the recommendations of the technical committee and to provide input from an operations-oriented perspective.

Another variation of this mechanism for including the legislative branch in the consensus-building process is to include legislators more directly in reviewing the forecasts. The mechanism could involve an advisory council consisting of members of the General Assembly and appointees of the Governor. The council, for example, would discuss the outlook of the Medicaid program and evaluate the validity of the expenditure forecasts. The council could be provided staff support from DMAS or DPB staff. This kind of review mechanism has been used for many years in the State's revenue forecasting process.

Recommendation (4). **The General Assembly may wish to amend the *Code of Virginia* to include a mechanism to ensure an expanded review of Medicaid expenditure forecasts. Such a mechanism could take the form of (1) a forecast review panel consisting of executive branch staff, (2) a review panel including legislative staff as well as executive branch staff, or (3) an advisory council including legislators and the Governor's appointees.**

CONCLUSION ON SOUNDNESS AND USEFULNESS OF MEDICAID FORECASTING METHODOLOGY FOR DECISION-MAKING

Based on the assessment of the Medicaid forecasting methodolgy in this report, three main conclusions can be drawn. First, Virginia's Medicaid expenditure estimates generally do not appear to be less accurate than those of other states nearby, in the South, or across the nation. Second, the forecast modeling itself appears to be sound and to have improved since the last JLARC study in 1992. Third, the current forecasting process could be improved to ensure that the final forecast is free of bias. If the General Assembly wishes to ensure that it receives an unbiased forecast (without independently generating its own), then a mechanism for expanded review of the Medicaid forecasts is needed.

Appendixes

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Appendix B: Descriptions of Virginia Medicaid Program Services B-1

Appendix C: Agency Responses C-1

Appendix A

Study Mandate

House Joint Resolution No. 143
1996 Session

Directing the Joint Legislative Audit and Review Commission to study the current methodology used to forecast Medicaid expenditures.

WHEREAS, Medicaid is the fastest-growing segment of the Commonwealth's budget, consuming 14 percent of the general fund budget, an increase from four percent just 10 years ago; and

WHEREAS, historically, Medicaid growth has been driven by Federal mandates, inflation, and utilization; and

WHEREAS, even modest growth in service demand and health care inflation will create significant future funding needs for Medicaid; and

WHEREAS, in light of proposals to cap the Federal share of Medicaid costs, Virginia will need to spend more state funds without federal match or impose limits by restricting eligibility, reducing the amount and type of service, or limiting payments to providers; and

WHEREAS, the demand for services, particularly among the elderly, is expected to grow, and even under the proposed block grants, eligible populations and minimum levels of funding are likely to be required; and

WHEREAS, Virginia has already implemented more than seventy cost containment actions and managed care initiatives, and while further cost containment is possible, savings in proportion to the total budget will be relatively small; and

WHEREAS, accurate, up-to-date, and objective information will be needed to project future costs and to make necessary decisions about eligibility, services and reimbursement, especially in response to changes at the Federal level; now, therefore, be it

RESOLVED by the House of Delegates, the Senate concurring, That the Joint Legislative Audit and Review Commission be directed to study the current methodology used to forecast Medicaid expenditures. The Commission shall make recommendations regarding the soundness and usefulness of the methodology for decision-making. The review should include whether current population-based forecasting is sufficient or whether further demographic analysis is necessary to improve cost projections, a comparison to forecast models used in other states and by the federal government and should also

include, but not be limited to, the technical and organizational aspects of the forecast methodology.

The Commission shall complete its work in time to submit its findings and recommendations to the Governor and the 1997 Session of the General Assembly as provided in the procedures of the Division of Legislative Automated Systems for the processing of legislative documents.

Appendix B

Descriptions of Virginia Medicaid Program Services

Inpatient Hospital Services. Acute care services that are ordinarily furnished in an inpatient hospital setting for the care and treatment of an individual.

Outpatient Hospital Services. Diagnostic, therapeutic, rehabilitative or palliative services provided in an outpatient hospital setting and ordered and provided under the direction of a physician or dentist.

Physician Services. Services provided by or under the supervision of a physician within the scope of medicine, osteopathy or psychiatry.

Nursing Facility Services. These are services provided to clients who need care on a daily basis. Persons seeking admission to a nursing facility are screened by Medicaid to determine the medical need or the potential for placement in an alternative community-based care program. While the number of nursing facility days is not limited, a patient's condition is reviewed periodically to determine the continuing need and appropriate level of care.

Home Health Services. Health care and/or short term supportive services provided to home bound clients in their residences under a plan of treatment written by the patient's attending physician. Services may include nursing care, physical therapy, occupational therapy and speech-language pathology services. Durable medical equipment and supplies are available to home health recipients based upon a physician's plan of care.

Laboratory and X-ray Services. Professional and technical laboratory and radiological services are covered when ordered by a physician or dentist. The services may be provided in an office of a physician or dentist, certified independent laboratory, or in a laboratory of the Department of Health or local health department.

Family Planning Services. These services are available to clients of child-bearing age, and may include consultation, examination, treatment, drugs, medically-approved methods and devices to prevent conception, and volutary sterilizations.

Early and Periodic Screening, Diagnosis and Treatment Services (EPSDT). This program refers to screening and diagnosis services used to determine physical or mental problems in clients less than 21 years of age. Health care treament and other measures are provided to correct or improve any problems and chronic conditions discovered. Services include health and developmental history screening, immunizations, nutritional status assessment, vision and hearing testing, dental services for children three years and older, and visual treatment including eyeglasses. Local Departments of Social Services are required to inform eligible individuals of the EPSDT Program, but recipient participation is voluntary.

Nurse Midwife Services. This program involves the management of the care of mothers and newborns throughout the maternity cycle, which is defined as the period covering pregnancy, labor, birth and up to a maximum of six weeks postpartum. Nurse midwives are enrolled directly by Medicaid, but the Commonwealth's licensing laws require their supervision by a licensed physician.

Rural Health Clinic Services. These are preventative, diagnostic, therapeutic, rehabilitative, or palliative items or services provided to clients on an outpatient basis under the direction of a specifically trained primary care practitioner (typically called physician assistants and nurse practitioners) by a facility that is not part of a hospital, but is specifically designated as a Rural Health Center in accordance with the Rural Health Clinic Services Act of 1977. The intent of this act is to increase the availability of primary and emergency care services in medically underserved rural communities.

Federally Qualified Health Center Services. These are preventative, diagnostic, therapeutic, rehabilitative, or palliative items or services provided to clients on an outpatient basis under the direction of a specifically trained primary care practitioner (typically called physician assistants and nurse practitioners) by a facility that is not part of a hospital, but is specifically designated as a Federally Qualified Health Center in accordance with the Public Health Services Act. FQHCs are more commonly known as community health centers, migrant health centers, and health care for the homeless programs.

Payment of Medicare Premiums. The federal government mandates payment of Part A (hospital insurance) and Part B (voluntary supplementary medical insurance) Medicare Premiums, deductibles and co-payments for Qualified Medicare Beneficiaries (QMBs) and Qualified Disabled Working Individuals, both groups being part of the Categorically Needy. Payment of Part B Medicare premiums for Special Low-Income Medicare Beneficiaries (SLMBs) is mandated by section 1902(a)(1)(E) of the Social Security Act, which was added by section 450(b) of the Omnibus Budget Reconciliation Act of 1990. The program also pays the cost of Medicare Premiums Part B, deductibles and co-payments for the Medically Needy who qualify. This is an optional service, and the Commonwealth funds the entire cost of the program.

Transportation Services. Both emergency and non-emergency transportation services are provided, with certain limitations, to Virginia Medicaid recipients to ensure that they have necessary access to and from providers of all medical services covered by the State Medicaid Program. Covered transportation services are categorized into two major categories: ambulance and non-ambulance services, which may include common carrier bus services (intra-city and inter-city), commercial taxicab services, services of special project vehicles, registered drivers, and commercial air carrier services.

Dental Health Services. The basic elements of dental care necessary for good health are provided for indigent clients younger than 21 years of age. These include restorations, emergency services for the relief of pain and elimination of infection, and preventative services and treatment such as X-rays, cleaning and fluoride applications.

High cost procedures, including dentures and partial and permanent bridgework, are not covered.

Intermediate Care Facility — Mental Retardation Services. These services are provided by a facility or distinct part of another facility in which the primary purpose is to provide health or rehabilitative services for mentally retarded persons, or persons with related conditions, and which is certified by the Department of Health as meeting the federal certification regulations for an ICF/MR. These facilities must address the total needs of the resident (which include physical, intellectual, social, emotional and habilitation) and provide active treatment. "Active treatment" consists of an aggressive, structured, individualized, and professional supervised program based on measurable goals to help the resident function at the highest level possible.

Mental Hospital Services for the Aged (65 years and older). These include inpatient hospital and nursing facility services. Diagnosis, treatment and care of individuals with mental diseases are provided.

Pharmacy Services. Prescribed drugs are substances prescribed by a physician or licensed practitioner for the cure, mitigation, or prevention of diseases, or for health maintenance. Drugs must be dispensed by authorized pharmacies or dispensing physicians using a written prescription which is kept on record.

Other Clinic Services. These include diagnostic, therapeutic, rehabilitative or palliative items/services; psychiatric therapy; and renal dialysis services provided on an outpatient basis under the direction of a physician or dentist by a non-hospital facility that is organized and operated to provide outpatient medical care.

Other Practitioner Services. These include any medical or remedial services provided by a licensed practitioner other than a physician or dentist. Other practitioners may include podiatrists, nurse midwives, psychologists and optometrists.

Rehabilitation Services. Rehabilitation services include general physical therapy, occupational therapy and speech-language pathology services which are provided by acute care inpatient hospitals, rehabilitation hospitals, rehabilitation agencies, home health providers, and outpatient hospitals. In addition, intensive rehabilitation services provide a package of comprehensive rehabilitation nursing, speech-language pathology services, social services, psychology, therapeutic recreation, durable medical equipment, and physical, occupation or cognitive therapies.

Hospice Services. Hospice services are a medically directed, interdisciplinary program of palliative services for the terminally ill and their families. Hospice emphasizes the control of pain and symtoms by use of a team of professionals, including physicians, nurses, counselors, therapists, aides and volunteers. The majority of hospice services are delivered in the home with inpatient care available as needed. Hospice services require an initial authorization and physician certification. To be reimbursed, the hospice must provide the following core services: nursing, physician, medical, social services, counseling, and home health aide and homemaker services. In addition, if the

patient's condition warrants it, durable medical equipment and supplies, drugs and biologicals and rehabilitation services (for sympton control and maintenance of activities of daily living) may be provided.

Durable Medical Equipment. All medically necessary medical supplied and equipment are covered for Medicaid recipients receiving care and services through a certified home health agency; being discharged from an intensive rehabilitation program; receiving Early and Periodic Screening, Diagnosis and Treatment (EPSDT); and receiving coordinated care under the technology-dependent, AIDS or elderly and disabled waiver programs.

Appendix C

Agency Responses

As part of an extensive validation process, the major State agencies involved in a JLARC assessment effort are given an opportunity to comment on an exposure draft of the report. Appropriate technical corrections resulting from the written comments have been made to this version of the report. Page references in agency responses relate to an earlier exposure draft and may not correspond to page numbers in this version of the report.

060496

COMMONWEALTH of VIRGINIA

ROBERT C. METCALF
DIRECTOR

Department of Medical Assistance Services

SUITE 1300
600 EAST BROAD STREET
804/786-7933
804/225-4512 (Fax)
800/343-0634 (TDD)

May 31, 1996

Dr. Gregory Rest
Joint Legislative Audit and Review Commission
Suite 1100, General Assembly Building
Capitol Square
Richmond, Virginia 23219

Dear Dr. Rest:

We have reviewed the exposure draft of JLARC's "Technical Report: Review of the Medicaid Forecasting Methodology," and have no comments beyond those already provided to you in conversations with our staff.

DMAS staff have enjoyed working with you in regard to this issue and thank you for all the courtesies you have shown us.

Sincerely,

Joseph M. Teefey
Deputy Director

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COMMONWEALTH of VIRGINIA

Robert W. Lauterberg
Director

Department of Planning and Budget

200 N. Ninth St., Room 418
Richmond, VA 23219

June 4, 1996

Mr. Philip A. Leone
Director
Joint Legislative Audit and Review Commission
General Assembly Building, Suite 1100
Richmond, Virginia 23219

Dear Mr. Leone:

I want to compliment you and your staff on JLARC's comprehensive review of the executive branch's Medicaid forecasting methodology. This report represents a thorough study of the technical attributes of our forecast models and provides policy makers with an independent assurance that the information we provide them is sound.

Correctly predicting the future is an exceptionally difficult endeavor. Yet it is one that we must attempt as we plan for tomorrow's needs. I am pleased to find that, compared to all other states, Virginia's Medicaid forecasts perform admirably even through the turbulent times we are now experiencing in the health care industry. The historically high degree of accuracy in Virginia's Medicaid forecasts reflects our commitment to making prudent budget decisions based on the best available technical analysis.

Even though, as JLARC reports, our forecasts have been exceptionally accurate (within 0.1 percent in FY 1996), we recognize that continued improvement is always desirable. JLARC's recommendations for improving our process are greatly appreciated and worthy of consideration. However, the recommendation that the Department of Planning and Budget (DPB) move its forecasting schedule forward one month and provide ongoing analysis throughout the year would be difficult to implement. As JLARC correctly points out, the Economic and Regulatory Analysis section in DPB is already carrying an extraordinary workload and would require additional resources to implement the JLARC recommendation. Given the accuracy of our current forecasting efforts, these additional requirements do not appear cost-justified.

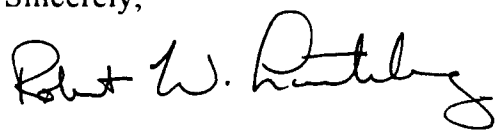
FAX (804) 225-3291 (804) 786-7455 TDD (804) 786-7574

On the issue of incorporating forecast data into the final budget, it would be fiscally imprudent for either branch to base its proposals on anything less than the most up-to-date information when the final budget is actually proposed and deliberated. The possibility of enhanced policy initiatives, requirements for a balanced budget, and the expected availability of updated financial information all suggest that it would be unwise to "close the door" on Medicaid at this early date.

DPB appreciates the positive input contained in this report. As the record indicates, DPB is committed to producing accurate forecasts. We will continue to explore cost-effective ways to further enhance the quality of our forecasting process.

Thank you for the opportunity to comment on your review.

Sincerely,



Robert W. Lauterberg

JLARC Staff

RESEARCH STAFF

Director

Philip A. Leone

Deputy Director

R. Kirk Jonas

Division Chiefs

● Glen S. Tittermary
Robert B. Rotz

Section Managers

John W. Long, Publications & Graphics
● Gregory J. Rest, Research Methods

Project Team Leaders

Craig M. Burns
Linda Bacon Ford
Susan E. Massart
William L. Murray
Wayne M. Turnage

Project Team Staff

Emily J. Bikofsky
Patricia S. Bishop
Steven E. Ford
Deborah Moore Gardner
Harold E. Greer, III
Joseph J. Hilbert
Jack M. Jones
Marcus D. Jones
Melissa L. King
Eric H. Messick
Eric P. Rollins
Desmond Saunders-Newton
Ross J. Segel
E. Kim Snead
Paul Van Lenten
Rowena P. Zimmermann

ADMINISTRATIVE STAFF

Section Manager

Joan M. Irby, Business Management & Office Services

Associate Office Manager

Charlotte A. Mary

Administrative Services

Becky C. Torrence

SUPPORT STAFF

Technical Services

Desiree L. Asche, Computer Resources
Betsy M. Jackson, Publications Assistant

● *Indicates staff with primary assignments to this project*

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