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Review and Evaluation of the VA Enrollee Health Care Projection Model

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Summary

The Veterans' Health Care Eligibility Reform Act of 1996 significantly expanded the mission of the VA. The reform act vastly increased the types of services offered to VA patients and extended medical coverage to all veterans through a priority-based enrollment system. The VA now operates the largest integrated health care system in the United States. In 2007, the VA had 7.8 million enrollees, served 5.5 million patients, and had a total operating budget of \$37.3 billion.

To meet veterans' health care needs under its expanded mission, the VA needs accurate forecasts of future resource requirements so that it can plan and budget accordingly. Developing these estimates is a formidable task because demand for VA resources is variable and difficult to predict. Currently, the VA uses a complex model—the EHCPM—as a planning tool to estimate future demand for medical care and related services among U.S. veterans. The model is maintained and operated by a contractor, Milliman, Inc. The EHCPM is currently used to develop the VA's annual budget request. The VA would like to extend the model's uses to support policy analysis and strategic planning.

The utility of the EHCPM depends on its ability to provide accurate and timely projections of future demands on VA resources. To gauge the model's utility as a budgeting and planning tool, the VA asked RAND and an independent, senior-level actuary to conduct an assessment of the EHCPM. Specifically, RAND was asked to perform two tasks:

- Review the model's key features to determine how effectively they support the VA's budget and planning needs.

- Assess the benefits and risks associated with current model specifications and current contractual arrangements.

Study Methods

To conduct the assessment, RAND, in conjunction with subcontractor Actuarial Services & Financial Modeling, Inc., performed several tasks. We reviewed model documentation; generated and reviewed responses to ad hoc questions about model features and contractual arrangements posed to VA and Milliman; reviewed Milliman’s corporate capabilities and background, the qualifications of key Milliman staff, and a summary of hours billed from March 2005 to May 2006; attended a 2-day model training course; visited Milliman headquarters to review proprietary model inputs; participated in a half-day discussion with senior VA staff from the VA Office of the Assistant Deputy Under Secretary for Policy and Planning and the Office of the Chief Financial Officer; reviewed accuracy and validity studies prepared by Milliman; and developed a small, prototype model that replicates EHCPM output under alternative assumptions regarding VA’s cost structure.

How the Model Works

The EHCPM model projects total expenditures in any given year by combining output from three subcomponents—enrollment level, utilization rate, and unit cost. These elements are multiplied together for each of 58 medical services for roughly 40,000 enrollee types, or “cells.” These cells are defined by age category, by whether enrollment occurred before or after eligibility reforms, by priority level, and by geographic sector. The model applies four types of trend factors to account for general changes in medical costs and the anticipated changes in the efficiency of VA providers. The trend factors are utilization, inflation, intensity of service provision, and a measure of management efficiency (referred to by Milliman as the “degree of community management”). In addition, the model accounts for anticipated changes in veteran mor-

bidity and reliance on the VA health care delivery system, enrollment levels, and enrollment mix. The model's three subcomponent models are described in more detail below.

Enrollment Projection Model

The enrollment model is the simplest of the three subcomponents. It develops projections by applying historic enrollment rates to the forecast veteran population derived from U.S. Census data. Modeled enrollment rates are obtained by age, priority level, geographic sector, and participation in Operation Enduring Freedom or Operation Iraqi Freedom—referred to as *special conflict* status. The projected enrollee population is equal to current enrollment plus new enrollment minus deaths. Although enrollment rates reflect demographic trends in the veteran population, such as shifts in priority level and geographic migration, they do not account for trends in the generosity, availability, and affordability of private-sector health insurance that could lead veterans to enter or leave VA health care.

Utilization Projection Model

Modeled utilization is based on the Milliman Health Cost Guidelines (HCGs), a proprietary set of utilization-rate benchmarks derived from commercial data. The HCGs contain data on utilization for 37 of the 55 EHCPM health service categories. These data are based on a standard fee-for-service benefit package. Milliman applies a complex set of adjustments to the HCG data to reflect the health status of VA enrollees, their reliance on VA, and the relative efficiency of VA facilities. In each projection year, utilization rates are adjusted to account for national trends in health care utilization and VA-specific trends in management efficiency. Because model management trends are calibrated against the local community in which each VA facility operates, projected changes over time in the efficiency of VA practice are implicitly tied to community practices. In a final step, adjusted HCG benchmarks are calibrated to actual VA workload in the model base year to account for differences between the VA and the private sector that are not captured by adjustment. Milliman refers to this as the “Actual to Expected Adjustment.” Services without commercial counterparts

(such as VA-specific outpatient mental health services, blind rehabilitation, and over-the-counter drugs and supplies) are projected directly from VA workload data.

Unit Cost Projection Model

Average unit cost (that is, the cost of a particular medical service) is derived by allocating VA's base year budget obligation to base year VA workload in each service category. Many of the service categories in the utilization model are developed at a finer level of detail than the service categories defined in the VA's cost accounting system. In these cases, the model relies on calculated relationships between VA cost levels and Medicare-allowable or billed charges to estimate VA unit costs by service category. Inflation and intensity trends are then multiplied by base year average unit costs to project unit costs in any given year.

Results of the Assessment

Our assessment addressed four main questions: (1) Validity—does the model measure what it is intended to measure? (2) Accuracy—how accurately does the model forecast the outcomes it is intended to project? (3) Tractability—how easily can modelers and users understand, and potentially replicate, the model's features, especially its validity and accuracy? (4) Transparency—how clear are the model's assumptions and operating processes? The results of our assessment are summarized below.

How Valid Is the Model?

We conclude that the EHCPM is likely to be valid for short-term budget planning but may not be valid for longer-range planning and policy analysis. The EHCPM represents a substantial improvement over the budgeting methodologies used by the VA in the past for two reasons: (1) The model builds total expenditures from detailed service categories and enrollee types, and (2) it disaggregates enrollment, utilization, and cost components. Thus, the VA can use the current specification to identify factors that drive specific types of expenditures or

expenditures for specific types of enrollees. The VA can also use the model to develop more-informed strategies for managing expenditures and allocating budget appropriations. Because it incorporates a wide range of utilization and unit cost parameters for a variety of services and enrollee types, the current model structure can be used to monitor budget execution and performance relative to preestablished benchmarks. Limited accuracy and timeliness in the VA data systems—not limitations in the model structure itself—are the only constraints on the model's utility with respect to these functions.

However, the model could yield misleading results when used for strategic planning and policy analysis. Using the model to inform scenarios beyond the current policy and budgetary environment requires assumptions about a number of factors, including the VA's cost structure; how rapidly the VA can expand its capacity to meet demand; the factors driving enrollment levels; the comparability of patterns of health care use in the VA and commercial sectors; and the relationships among enrollee health status, VA treatment capacity, and enrollees' preferences for treatment in VA facilities. In many cases, a lack of appropriate data or uncertainty about the future makes the assumptions difficult or even impossible to assess.

Modifications to model subcomponents and enhancements of supporting data inputs would likely be required before the model could support a broader range of applications beyond short-term budget planning. These modifications are needed for two reasons. First, under the current specification, short-term utilization projections are tied to VA experience and thus do not measure potential demand independent of the current VA delivery system. Second, the current specification treats the VA's cost structure like that of a fee-for-service payer, such as Medicare or a commercial insurer. Thus, if a substantial proportion of the VA's costs are fixed, projected expenditures will be unrealistic. Fortunately, the model has a flexible, component-based structure under which modifications can be implemented without sacrificing the continuity of budget-planning applications.

How Accurate Is the Model?

The accuracy of the EHCPM is difficult to assess and is thus uncertain. As we discuss below, factors that hinder assessment of model accuracy are, in large part, those that limit model validity. In our view, the most challenging barrier to accuracy stems from the lack of unit cost measures that are independent of the VA's budget allocation. This is because the discretionary nature of the VA's budget complicates the relationship between model projections and actual expenditures. Under a discretionary budget, the VA does not have the authority to spend more than Congress appropriates. If demand for VA services cannot be satisfied under its appropriation, then "actual" expenditures will reflect the constraints inherent in the appropriation and not true demand for VA care, which model developers strive to project. In such a circumstance, accessing the overall accuracy of expenditure forecasting models by comparing projections against an approved budget can be misleading.

Several other factors further complicate an assessment of EHCPM accuracy, over and above those that must be addressed in assessing the accuracy of policy models more generally. Because the VA data systems upon which the model relies and the current structure of the VA benefit are relatively new, opportunities for assessing accuracy against historical utilization experience are limited. Finally, because unmet demand is not observed, it is not possible to compare projected demand with actual total demand. To our knowledge, no specialized analytic methods have been established or ancillary data collected and analyzed for the purpose of assessing accuracy in the context of these challenges.

How Tractable and Transparent Is the Model?

The overall structure of the model is relatively easy to understand. However, this is not true of the model's subcomponents. Tractability and transparency are reduced by the complexity of adjustment algorithms used to set parameters of model subcomponents; the uneven and often incomplete model documentation; reliance on proprietary utilization data and clinical efficiency benchmarks, the quality and appropriateness of which cannot be reviewed by interested parties; and the lack of a process for obtaining independent reviews of the model by outside experts.

Benefits and Risks of Using the EHCPM

Based on our review of model features and an informal assessment of the contractual arrangements under which the EHCPM is developed and maintained, we assessed the benefits and risks to the VA of the current model specification and existing contractual arrangements. Compared to traditional methods, the current specification offers the benefit of a substantially more flexible and detailed platform from which to plan the VA's appropriation request, monitor budget execution, and assess system performance. The main risk to the VA stems from the potential for misleading projections when the model is used to inform future policy and budget decisions. Overall, we find the risks of outsourcing to be low and manageable. The most important risk of outsourcing to consider is the lost opportunity to build institutional knowledge of internal VA staff through day-to-day participation in model-related activities.

Conclusions

While the current EHCPM is useful for short-term budget planning, our review suggests it is of limited utility for planning and policy analysis. To enhance the utility of the model for these activities, the VA might consider modifications to model subcomponents to allow for more-robust forecasting of the demand for and cost of VA care in a changing policy environment. Such modifications are likely to require substantial investments to expand VA's on-going survey efforts and to develop tools for measuring treatment capacity and costs. If such investments are not practical or feasible, the VA may want to investigate simplifications of the current model that draw more exclusively on the VA's own data resources. A simpler model would be more transparent to model constituents and may perform equally well. Under either an enhanced or simplified model, the VA might also consider other improvements, including more-approachable and complete documentation, involvement of a wider range of experts in model development, and periodic review by independent experts.