Our analyses of VERA focused on assessing the impact of particular variables on patient care costs. We also estimated how VISN allocations change after controlling for various patient and facility characteristics. Throughout our analysis, we focused on the concerns expressed by Congress in the legislation authorizing the study.

Our major findings can be summarized as follows:

- The current VERA system for allocating resources to VISNs does not account for a number of measurable factors that affect patient care costs, including patient and facility characteristics that vary systematically across VISNs and that are largely beyond VISN directors’ control. Alternative methods for allocating resources to VISNs, based on the principles that guide VERA but that better account for these factors, may produce a more equitable allocation system.

- Case-mix measures play a key role in explaining patient-level cost differences. Overall, more-detailed case-mix measures accounted for more of the variation in patient care costs than less-detailed measures. All three alternatives examined in this report had significantly more explanatory power than the method currently used in VERA.

- Age and sex independently affect patient care costs, controlling for alternative case-mix measures and other factors.

- The degree to which VA patients rely on Medicare providers for the care they receive has a significant impact on VA costs. As we might expect, patients who are more reliant on Medicare providers incur lower VA costs vis-à-vis those patients who receive little or no care from Medicare providers.

- Veterans who live in urban and suburban areas use more resources than those who reside in rural areas. At the same time, costs are higher for those veterans who must travel longer distances for care.

- Most facility infrastructure characteristics—including age, historical significance, total building count, and average physical condition—do not appear to have a significant independent effect on patient care costs. However, the number of square feet of building space both per patient (a measure of building capacity and the extent to which it is being used efficiently) and per acre of land (a measure of the density of the infrastructure) increased average facility costs.
• The choice of case-mix measure and the other factors included in the policy model influence whether teaching is an important factor in explaining patient care costs. Teaching intensity is a significant factor only with the VA DCGs, where it has a negative effect on facility costs (facility costs decrease as the ratio of residents to physicians increases).

• Research intensity (measured by the research costs per 1,000 unique patients) is positively associated with facility costs.

• In comparing our simulation results to actual FY 2002 allocations, we found that for our base case—in which we applied our regression methodology and controlled for the same set of factors that the VA currently controls for—$282 million, or 1.5 percent of the total appropriation, would be redistributed across the VISNs.

• To determine the effect of including additional variables (e.g., age, gender, and Medicare reliance), we compared the simulations from the base case to those from the VERA-3 policy model. The total amount of money that is redistributed by the VERA-3 policy model, relative to the base case, is $433 million, or 2.4 percent of the total appropriation.

• To illustrate the effect of alternative case-mix measures, we compared simulations from the VERA-3 policy model with those from the other case-mix specifications. The choice of case-mix measure has a substantial impact on VISN allocations. Each of the three alternative case-mix measures examined here (VERA-10, VERA-47, and VA DCGs) would result in substantial movement of budget allocations across VISNs. The magnitude of the budget reallocation (relative to VERA-3) is sensitive to the choice of alternative case-mix measure. For some VISNs, the direction of the budget reallocation also varies by case-mix measure (i.e., some VISNs would gain if the VA shifted to VERA-10, but those same VISNs would lose if the VA shifted to VA DCGs). However, this shift in direction occurs only in cases where the gain or loss is relatively small.

• The results from the comparisons between the VERA-3 policy model and policy models with the other case-mix measures illustrate that the movement from VERA-3 to VA DCGs redistributes substantially more money than would the movement to either VERA-10 or VERA-47. At the national level, the move to VA DCGs would redistribute 1.9 percent of the total appropriation compared to approximately 1 percent under VERA-10 and VERA-47.

• Our results were relatively insensitive to several methodological factors: the method used to allocate costs to patients (for the alternative cost methods we could examine), whether or not the Basic Care Priority 7 patients were included in the patient and facility regression equations, and the year of data used to estimate the models.

• When we included Basic Care Priority 7 veterans in the simulations, approximately half of the VISNs received larger simulated allocations and half received smaller allocations, compared to the simulated allocations based on policy models that excluded these patients (but included Complex Care Priority 7 veterans).
In light of these findings, we believe that the VA should consider modifying VERA to take greater account of patient and facility characteristics than it does now. Movement in this direction would retain most of the strengths of VERA while increasing the alignment between VISN allocations and patients’ health care needs. Specifically, we believe that VERA should expand the number of adjustments that it currently makes, to take into account the patient- and facility-level variables included in the policy model.

In principle, this expansion could be accomplished by sequentially adjusting VERA’s set of national prices—which, as indicated previously, are currently based on only three case types—for each variable included in the policy model. However, in practice, this modification would prove to be quite cumbersome. As a result, we recommend that the VA consider adopting an allocation system that relies on a regression/simulation framework similar to the one used in our analysis.

On the positive side, our modeling approach relies on data that are readily available and provides a method for generating VISN allocations after adjusting for both patient and facility characteristics. Our approach is also very flexible in that variables can easily be added or deleted to reflect changing policy objectives. We recognize, however, that our approach is somewhat complicated and may be difficult to implement. It may also represent a shift in underlying philosophy in that it attempts to link allocations more closely with particular costs (e.g., those related to treating more-complex cases and other costs that are beyond the control of VISN directors) vis-à-vis the current VERA system. Thus, before the VA implements an allocation system along the lines of the one we have suggested here, we believe it is important to conduct additional analyses to better understand how particular variables influence VISN allocations and to educate all relevant stakeholders on the pros and cons of adopting the regression-based allocation framework and of making adjustments above and beyond those currently included in the VERA system.

CASE-MIX ADJUSTMENT

When judging the merits of alternative case-mix adjustment systems, policymakers must take into account a number of factors, including explanatory power, incentive effects, transparency, and administrative complexity. In light of these findings, we believe that it is desirable for the VA to take greater account of case-mix differences across facilities and VISNs than the three case-mix categories (i.e., Basic Vested, Basic Non-Vested, and Complex Care) on which VERA is currently based. Doing so would lead to a more equitable and efficient distribution of VA resources. Specifically, among the four alternatives we considered (VERA-3, VERA-10, VERA-47, and VA DCGs), we recommend that the VA consider adopting either the VERA-10 or the VA DCGs case-mix measures. While VERA-47 represents an improvement over VERA-3 in the amount of patient cost variation explained, VERA-47 provides only a small improvement over VERA-10 while introducing considerably more complexity into the allocation system.

The choice between VERA-10 and VA DCGs involves some trade-offs. VA DCGs have greater explanatory power, compared with the VERA-10 case-mix measure; and they
are less likely to create an incentive to increase lengths of stay or to steer patients toward inpatient rather than outpatient care, because they are not based on patient utilization. However, VA DCGs are also less transparent than are the VERA-10 groups and would probably be more difficult to administer, at least in the short run. In addition, VA research has found that DCGs may be relatively less effective in accounting for long-term care and inpatient mental health costs. In the event that the VA decides to implement a DCG-based system, we recommend that the VA continue to explore refinements to that system, particularly with respect to severely mentally ill patients and those in long-term care.

Finally, as noted above, some VISNs would experience a positive reallocation under VERA-10, relative to VERA-3, and a negative reallocation under VA DCGs, or vice versa. While these patterns apply primarily to VISNs for which the absolute reallocation is relatively small, additional research to identify the reasons for these patterns may help inform the choice between VERA-10 and VA DCGs.

ACADEMIC AFFILIATIONS

The current method of funding education support and research support costs through separate allocations should be reconsidered if the allocation process is modified to include more-refined case-mix measures and/or a broader set of individual and facility characteristics. To some extent, the current education support allocations adjust for unmeasured case-mix differences and omitted variables. By refining the case-mix measure and adding other individual and facility factors, the size and the magnitude of the teaching measure changes. In the base case, the variable we used for teaching intensity (ratio of residents to physicians) is significant and positive. In the VERA-3, VERA-10, and VERA-47 policy and fully specified models, the variable is no longer significant. When VA DCGs are used as the case-mix measure, the teaching variable becomes significant and negative, that is, facility costs decrease as the ratio of residents to physicians increases. This finding suggests that the patient care services performed by the residents more than offset the costs of teaching-physician educational activities, once case mix and other factors are taken into account. If VA DCGs were implemented, continuing the education support allocations would provide excessive funding to teaching-intensive VISNs relative to other VISNs. We note that the effect of research activity on costs is less sensitive to the case-mix measure and other variables that are included in the allocation formula. Research has a consistently significant positive effect on cost, using any of the case-mix measures. Adjusting for both education and research within the regression framework would ensure that appropriate recognition is given to the effect of academic affiliations on patient care costs.

MEDICARE RELIANCE

We believe VERA should be modified to adjust for differences in the degree to which VA patients rely on Medicare providers for the care they receive. Although adjusting for Medicare reliance will undoubtedly increase the system’s complexity, it will also make the system more equitable. Adjusting for Medicare reliance might also help
mitigate the potential for VISNs to receive additional revenue for treating patients who receive the bulk of their care through Medicare providers, in the event that the VA adopted a case-mix measure, such as DCGs, that assigned patients to cost categories based solely on diagnoses.

**OTHER VARIABLES**

With the exception of the case-mix variables, the variables in the individual-level policy model (e.g., age, sex, urban or rural location, Medicare reliance, and Medicaid long-term care generosity) add little incremental explanatory power, overall, once case mix is taken into account. However, these non-case-mix variables are statistically significant (see Table 3.2); there are sound conceptual reasons for including them in the model; and they have a substantial impact on the simulated allocations (see comparison between the base case simulation and the VERA-3 policy model simulation in Table 3.5). Therefore, we recommend that the VA include them.

**PRIORITY 7 PATIENTS**

An issue of ongoing interest to the VA, veterans groups, and the Congress is whether Basic Care Priority 7 patients should be included in workload calculations. When addressing this issue, decisionmakers must assess how patient care resources would be redistributed across priority groups, how the economic incentives facing VISN directors and facility managers would be altered, how waiting times and appointment backlogs might be affected, and possibly even how the quality of care offered to veterans could change. Such assessments would become especially crucial if a decision to include the Basic Care Priority 7 patients were not accompanied by a larger medical care appropriation and/or enrollment reforms.

Although our analysis does not point to a clear recommendation regarding whether Basic Care Priority 7 patients should be included in workload calculations, it does illustrate how VISN allocations would have been altered in 2002 had the VA decided to include these patients in their workload calculations. Here, in comparing the sets of simulation results with and without the Basic Care Priority 7 patients, it is important to remember that VERA is a zero-sum game. Consequently, if the VA were to decide to include Basic Care Priority 7 patients in workload calculations, then some VISNs would gain revenue at the expense of other VISNs, assuming that Congress does not increase the medical care appropriation to take greater account of the costs of treating those patients.

**STUDY LIMITATIONS**

In considering our findings, the reader should keep the study’s limitations in mind.

First, while we had an enormous amount of patient-level data at our disposal—nearly four million patient records—the facility data set, with just 143 observations, was quite small. The small number of facility observations may have limited our ability to detect particular effects.
Second, although the analysis generated insight into factors that explain variation in patient-level costs, we are unable to compare, for example, the average cost per patient to any sort of efficiency “gold standard.” In other words, we have no way of knowing what the “right” costs should be for any given patient. Rather, we are able to compare only how costs vary for patients and facilities with different characteristics. This problem is exacerbated by the fact that the necessary data are not available to adjust our cost data to reflect differences in quality of care across facilities and VISNs.

Finally, the validity of our analysis ultimately depends to a great extent on the completeness and quality of the data that were used to construct the patient and facility equations. In general, we found the patient-level data to be quite complete, with the exception of certain variables such as income. While we did not attempt to validate a sample of the patient data against data drawn from patients’ medical records, we did conduct a variety of reliability and validation checks using data from multiple years on the same set of patients. From what we could determine, the patient-level data appeared to be of very high quality.

However, we believe that the quality and completeness of the facility data could be improved. To some extent, the problems that we encountered in the facility data set were due to the large number of management consolidations that occurred over the last half dozen years or so. Often, we ran into difficulty obtaining data on all measures for the same set of facilities. We believe that if the VA chooses to adopt an allocation methodology that adjusts for facility-level characteristics, such as our regression/simulation approach, the quality of the facility data collection process should be improved. Specifically, the definition of what constitutes a facility should be developed (e.g., a management unit or physical location) and applied consistently throughout the data collection process.

**UTILITY OF THE MODEL**

In closing, we believe that in addition to generating important insights into the factors that influence the costs of providing care to the veteran population—with an emphasis on those factors expressed by Congress in the legislation mandating the study—our modeling approach provides VA policymakers with a valuable tool for making resource allocation decisions. The tool is both comprehensive, in the sense that it adjusts for a large number of patient and facility variables, and flexible, in that predicted costs could be aggregated in many different ways. Although we presented simulation results for a specific set of models and scenarios in this report, in reality, the tool can be used to conduct a much wider array of simulations, where particular variables are included or excluded from the patient- and/or facility-level regression equations, specific values are assigned to variables, and so on. Moreover, as mentioned earlier, apart from using the model to simulate VISN allocations under various policies, it can also be used by VISN directors in making allocations to facilities and by VA headquarters staff in the allocation adjustment, or supplemental, process.

To maintain the policy relevance of the model, it must be updated and refined on an ongoing basis. Two such refinements include incorporating more-recent VA and
Medicare data as they become available and incorporating quality and access measures as well. Moreover, to preserve the VA’s objective of allocating resources in as equitable and simplistic a manner as possible, additional analyses are required to better understand why various adjustments lead to relatively large swings in VISN allocations and to explicate more clearly the set of “prices” that each VISN will face for treating different types of patients. Over the next year, RAND staff will be working with the VA to refine the model and to determine the impact of controlling for additional variables on VISN allocations.