Department of Veterans Affairs

Office of Inspector General

AUDIT OF VETERANS HEALTH ADMINISTRATION DECISION SUPPORT SYSTEM STANDARDIZATION

VHA staff must adhere to the basic building-block structure of DSS if the system is to achieve its full potential.

Report No. 9R4-A19-075
Date: March 31, 1999

Office of Inspector General
Washington DC 20420

DEPARTMENT OF VETERANS AFFAIRS
Office of Inspector General
Washington DC 20420

Memorandum to the Under Secretary for Health (10)

Audit of Veterans Health Administration
Decision Support System Standardization

1. The Office of Inspector General audited the Department of Veterans Affairs (VA) Veterans Health Administration's (VHA) implementation of a new management information system intended to aid clinicians, managers, and executives in making decisions affecting the delivery of health care. The audit was requested by the Under Secretary for Health. The purpose of the audit was to determine if implementation of the Decision Support System (DSS) at 147 medical facilities was sufficiently standardized to ensure the usefulness of DSS data at local, Veterans Integrated Service Network, and VHA Headquarters levels. Through September 1998, we estimate that implementation of DSS cost about $140 million.

2. DSS is an information system of potentially major value to VA clinicians, managers, and executives. DSS represents VHA's first automated managerial cost accounting system for the delivery of medical care that will provide VHA managers, at all levels, with cost and clinical information for consideration when making clinical decisions, managing workload, and controlling medical care costs.

3. However, the potential usefulness of DSS and its data was being compromised because some medical center staff had diverged from the system's basic structural standard. Where such divergence had been detected, it prevented data from these medical centers being accurately aggregated along with data from other facilities that did adhere to the structural standard. We are also concerned that file/data divergences which had not been detected resulted in inaccurate data being aggregated into roll-up reports. In our opinion, facilities that have diverged from the DSS structural standard have also lost the opportunity to perform a variety of analyses that the structural standard provides.

4. In order that DSS can achieve its full potential, we recommended that the Under Secretary for Health: i) ensure that all staff and managers involved with DSS be required to input data into the local DSS systems in adherence with the standard DSS structure; ii) periodically determine the degree of adherence to the DSS structural model that is required of medical center systems; and iii) establish the controls necessary for full compliance with decisions made under ii).

5. The Under Secretary for Health concurred in all findings and recommendations in the report and provided acceptable implementation plans. In addition, the Under Secretary concurred in our statement of $140 million in monetary benefits. Therefore, we consider all issues in this report resolved, although we will continue to follow up on planned actions until completion.

For the Assistant Inspector General for Auditing

(Original signed by)

WILLIAM V. DEPROSPERO
Director, Chicago Audit Operations Division

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

Page

RESULTS AND RECOMMENDATIONS

DSS Will Achieve Its Potential Only if Its Basic Configuration Principles Are Adhered To by All VHA Staff

The Veterans Health Administration's (VHA) Decision Support System (DSS) will not achieve its intended purpose unless staff charged with implementing the system adhere to its basic structural model. As implemented at the time of our audit, DSS could not produce a roll up of clinical or cost data for every Department of Veterans Affairs (VA) medical center.

VHA Is Presently in the Process of Implementing a Computer System, Called the Decision Support System[1] at 147 Medical Facilities

DSS is both a managerial cost accounting system and a clinical tool that can be used to identify the most cost-effective clinical methodologies. The system is designed to provide information to medical facility, Veterans Integrated Service Network (VISN), and VHA Headquarters staff to assist them in making management and clinical decisions. It is an automated system that provides information on patterns of care on a patient- and provider-specific basis, and links resource consumption to these patterns. Functional capabilities include:

- Budgeting and planning for medical centers and VISNs.
- Resource distribution based on performance.
- Support of managed care.
- Equitable comparisons of VISNs and medical centers.
- Support of VHA funding requests to OMB[2] and Congress.
- Support of quality management functions.
- Enhancement of the MCCR[3] program.
- Productivity analysis and data on patient-specific costs.

We estimate that, through September 1998, DSS represented an investment of about $140 million for VHA.

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[1] *The term "decision support system" is both the title of this particular system in VA and a generic name for any computer system, in or out of VA, that supports management decision making.*

[2] *OMB – Office of Management and Budget.*

[3] *MCCR – Medical Care Cost Recovery.*

VHA Staff Were Not Adhering to the Basic DSS Structure in All Instances

In this report, "structure" refers to how particular workload and associated costs in DSS are brought together and reported. The association of a discrete set of costs with a single corresponding production unit represents the basic building block for all DSS data and data output. As one Chief Information Office (CIO) official put it, these are the basic DSS building blocks which ultimately can be arranged, rearranged, combined, re-combined, and un-combined in any way a data analyzer may choose. We found that staff at some medical centers have diverged sufficiently from the model DSS structure that usefulness of DSS data will be reduced. This could cause managers at all levels to lose an opportunity to improve management of VHA.

For example, we found that, in direct contrast to instructions of DSS development staff, one medical center combined all of its surgical workload and costs into one DSS department. The resulting department was so broadly defined that it obscured all of the myriad workload components that make up surgical services at a VA medical center. In addition, the department also combined both captured[4] and uncaptured workload, further lowering cost precision for individual intermediate products.

Aside from generally lowering the cost precision of intermediate products, combining so many discrete production units into one DSS department compromised medical center staff's ability to perform efficiency or effectiveness analyses of any of the subcomponents of the medical center's surgery program. Also, when rolled up to VISN and VHA Headquarters levels, surgery workload and cost data for that medical center were essentially meaningless, because they were too dissimilar to data from other medical centers.

The same medical center also combined inpatient and outpatient psychiatry workload, with their attendant costs, into one large DSS department. This created some of the same effects as happened with the facility's surgery program. However, it also prevented VHA top management from distinguishing between inpatient and outpatient workload, which is necessary for reporting and budgetary purposes.

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[4] *Captured workload is workload that is recorded in any of VA's various automated systems such as Veterans Health Information System and Technology Architecture (VISTA), Outpatient Treatment File, etc. The workload that is captured and the workload that is left uncaptured vary from facility to facility. This depends, largely, on the extent to which medical center staff use VA's Event Capture System. Examples of workload that may not be captured include consultations for inpatients and chaplain and social worker visits.*

Of the medical centers whose DSS structures we reviewed during this audit, the medical center referred to in the preceding paragraphs represented the most extreme case of failing to follow the DSS model. However, we observed that it was not the only medical center to deviate. Because DSS is so flexible in how it can be structured, varying degrees of divergence from the basic model result in varying degrees of impact. We observed one VISN that had different DSS structures for each of its medical centers, depending upon facility size and mission. We were also warned by some medical center DSS staff that, as more and more VA medical centers begin to experiment with non-traditional organizational structures and non-traditional medical care delivery methods, the temptation to deviate from the basic DSS model will increase.

Several Factors Have Contributed to Deviations From the DSS Model

The following factors contribute to a potential reduction in DSS' usefulness:

- A lack of understanding by some DSS field staff about how DSS works.
- The misconception that the DSS structure must mirror the medical center's organizational alignment.
- A lack of understanding among some field staff on how to use DSS to meet local management as well as upper management needs for complete and reliable data.
- Individual VISN management philosophies.

Deviation by Some Facilities From the DSS Model Reduces the Usefulness of DSS Data at All Levels Including the Local Level

DSS allows a large degree of flexibility in the way its reporting structures are developed, but this flexibility is lost if the basic DSS model is not adhered to. Because of a significant divergence from that model, data from one facility could not be included in the Fiscal Year 1996 VHA-wide DSS summary report. Although excluding that facility from the report helped ensure the accuracy and usefulness of data from the remaining facilities, the report was nevertheless incomplete and, we believe, its value was compromised.[5]

Without compatible and comparable DSS data from all reporting facilities, VISN and VHA managers will not have accurate and complete information to make decisions about

[5] *At this writing, we also have preliminary information that another medical center will be excluded from the Fiscal Year 1997 national roll-up report, with undoubtedly a similar impact.*

the distribution of programmatic resources. In addition, local managers, too, could lose flexibility in the use of DSS.

There Are Several Actions That Can Contribute to a Solution to the Problem Found With DSS

DSS development staff were aware of deviations from the basic DSS model at some medical centers. They recognized a need to ensure that medical center DSS structures adhere at least to the basic DSS model in order to generate usable data for VISN and VHA management.

A DSS structural "template" created by DSS development staff can be used to assist medical center staff in designing their DSS systems in such a way as to ensure data usefulness at all management levels. DSS developers also provided VISN and medical center staff with automated DSS structure "audit tools" to allow them to easily detect points of non-compliance with the template.

In addition, VHA officials have also established a DSS Steering Committee composed of VISN and medical center representatives. We believe that this committee, among its other purposes, should address issues such as those raised in this report.

Conclusion

We believe that additional actions are needed to ensure maximum usefulness of DSS data at all levels in VHA.

- Local DSS staff and users need to understand that the basic DSS model, if adhered to, is fully capable of meeting the data needs of all management levels. DSS' ability to group production units into any set of larger reporting groups that users may choose ensures the maximum utility of DSS data at all management levels, and by maintaining relatively small production units with closely related products, DSS can calculate product costs with better precision.

- To better guide local staff in their implementation of DSS systems, VISN and VHA Headquarters management need to continually update what their DSS data needs are. They need to determine what types of reports they want, what the data elements should be, and what the formats should be. We would expect these determinations to be part of an overall assessment of VHA's "business needs."

- VHA top management must then ensure that DSS structures in use at medical centers adhere to the basic DSS model to satisfy the business and data needs of local, VISN, and VHA Headquarters managers.

- Much of this effort will involve the "education" of staff at all levels. To this end, facilities and VISNs that have successfully implemented DSS in adherence to the model should be identified and held up to others as "best practices" sites, so that they can be emulated.

These actions should be taken in consultation with representative users of DSS data at all levels. The newly established DSS Steering Committee appears to be an excellent vehicle to do this. We also believe that these actions need to be taken quickly. Otherwise, as time goes by, local structures will tend to become more and more divergent from the DSS model, and bringing errant medical center systems back in line with the model will become ever more difficult.

For More Information

- *More detailed information about what DSS does and how it works is contained in Appendix III.*
- *More detailed information about the effect of not adhering to the basic DSS structural model is contained in Appendix IV.*
- *More detailed information about local uses of DSS data versus VISN and VHA Headquarters use of DSS data is contained in Appendix V.*
- *A glossary of DSS related terminology is contained in Appendix VI.*

Recommendation 1

In order that DSS can achieve its full potential, the Under Secretary for Health should:

a. Ensure that all staff and managers involved with DSS understand the necessity of maintaining local DSS systems in adherence with the basic DSS model.

b. Periodically determine the degree of adherence to the DSS structural model that is required of medical center systems.

c. In coordination with the Chief Network Officer, establish the controls (*i.e.*, incentives and consequences) necessary for full compliance with decisions made under Recommendation 1b.

The associated monetary benefits for this recommendation are shown in Appendix VIII.

Under Secretary for Health Comments

The Under Secretary for Health concurred in all recommendations and provided acceptable implementation plans. (The full text of the Under Secretary's comments and implementation plans are contained in Appendix VII.)

Office of Inspector General Comments

The Under Secretary's comments and implementation plans are acceptable and we consider all issues resolved. However, we will follow-up on the implementation of planned corrective actions.

MANAGEMENT ADVISORY

During the audit, other issues involving DSS were brought to our attention that could affect the usefulness of DSS.

Number and Qualifications of Assigned DSS Field Staff

A major concern of VHA's Chief Information Office (CIO) staff is the number and credentials of staff assigned by VISNs and medical centers to DSS implementation in the field. CIO staff told us that they believed some facilities, and some VISNs, have not devoted sufficient numbers of staff or sufficiently capable staff to the timely implementation of DSS. Our own interactions with DSS field staff during training seminars confirms this belief. Failing to devote sufficient staff with appropriate skills will impact DSS' ultimate ability to deliver a useful product to managers at all levels.

Some CIO staff expressed a suspicion that the failure to support DSS with sufficient and appropriate staff reflects a concern by field managers about DSS' ultimate usefulness. Thus, in a sense, is created a self-fulfilling prophecy. That is to say, appropriate staff are not devoted to DSS because it is believed to be a waste of resources, thus DSS becomes a waste of resources because appropriate staff have not been devoted to it.

Related to that, and based on our numerous interviews with local and VISN staff, we believe that managers at some sites may be resisting DSS, and consequently the staffing appropriate to it, because:

- It is new and different and requires a difficult paradigm shift to effectively use.
- They believe they already have all the information they need to effectively manage their operations.
- They fear VHA Headquarters officials may use DSS data to micromanage their facilities.

Newly Added Intermediate Products

Some field staff expressed concerns to us about how DSS treats costs associated with newly added intermediate products. For example, if a medical center adds a new capability, such as a new cardiology clinic, costs associated with that activity are treated as overhead, like uncaptured workload, until the new clinic is added to the DSS database during a once-per-year "open season." Staff in one VISN stated that new products were being added at such a rapid pace in some of its facilities that they believed a once-per-year open season was insufficient to ensure the usefulness of their DSS data.

Because this issue was outside the scope of our audit and because it was raised in only one of the VISNs we studied, we chose not to pursue it in the context of this audit. However, we believe that VHA top management should be aware of the issue, and may wish to have appropriate CIO staff address it further.

The Impact of Using VA's Event Capture System

Most VA medical centers capture workload in automated systems that form part of their Veterans Health Information System and Technology Architecture (VISTA) systems. Among others, these usually include such activities as drug dispensings, outpatient clinic visits, surgical procedures, and bed days of care by specialty. However, traditionally, most VA medical center systems have not captured data on such activities as procedures done during outpatient visits, some kinds of physician consultations, and chaplain and social worker interactions with patients.

Some medical centers have begun using an automated system called the Event Capture System (ECS) to account for this previously unrecorded workload. Originally developed to identify rehabilitation medicine workload, ECS has been adapted by these medical centers to capture workload not recorded in other VISTA packages. ECS is not used by every medical center[6] and it is not used to the same extent by all of those medical centers that do use it.

Because ECS is not in universal use in VA, many medical centers cannot capture all of the workload data needed for accurate costing. At medical centers without ECS, costs associated with uncaptured workload are apportioned equally to all patients and all production units through use of DSS' Department 5WW1, whether these patients and production units actually incurred the costs or not. Medical centers with ECS are able to identify costs much more specifically.

As a hypothetical example, a medical center without ECS might apportion as much as $200 in undifferentiated costs to each bed day of care it provides. On the other hand, a medical center using ECS might be able to associate as much as $150 of that $200 to the actual activities that provided services to bed inpatients. The second medical center then has only $50 per bed day in undifferentiated costs and, incidentally, also appears to have a much lower cost per bed day of care than the first medical center. Thus, at medical centers that use ECS, more of the costs that should be associated with actual measurable workload are, in fact, attributed to that workload and not averaged across all workload.

[6] *As of the writing of this report, only about 83 medical centers used ECS, and then only in varying degrees.*

Use of ECS allows an increased precision in distribution of costs among workload. However, because it is not used in every VA medical center, or to the same extent in the facilities that do use it, VHA top management needs to be aware that their ability to fairly compare some kinds of costs among facilities, using DSS data, is likely to be negatively impacted.

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OBJECTIVES, SCOPE, AND METHODOLOGY

Objectives

The purpose of the audit was to determine if DSS is being implemented in a sufficiently standard manner at the 147 VHA sites so that information produced at individual sites can be meaningfully aggregated and used by upper level managers (VISN and VHA Headquarters) to make informed decisions.

Scope and Methodology

All of the audit work, including interviews with DSS developers and contractor staff, DSS field staff and their managers, VISN and VHA managers, and CIO staff were conducted in Fiscal Year 1998. Analyses of DSS systems at various audit sites were based on systems in use at the time of each review and were all accomplished in Fiscal Year 1998. With one exception, historical data was reviewed only to gain an understanding of the current status of DSS implementation. The exception involved the completeness of DSS roll-up data for Fiscal Years 1996 and 1997.

To familiarize ourselves with DSS and with the issues involved, we received extensive training from DSS program staff. Selected audit staff also attended conferences and other training venues related to DSS. During the audit itself, we interviewed, in person or by telephone, the following:

- Medical center and VISN managers and DSS staff located at 13 medical centers in 6 VISNs
- DSS development staff and other staff in the Office of the CIO
- DSS contractor staff
- VHA Headquarters managers

We also reviewed documentation related to the issues addressed in this report and provided by CIO, VISN, and medical center staff. We reviewed and compared the DSS data structures that were in use at 13 selected medical centers at the time of the audit (predominantly between December 1997 and July 1998).

While we did not perform detailed validation of data included in the several automated DSS systems we reviewed, we did analyze the data structures of these systems to determine if they were in accord with the model structure established by DSS developers and contractors. With that exception, the audit was conducted in accordance with generally accepted government auditing standards and consisted of such tests as were deemed necessary under the circumstances.

BACKGROUND

VA's Decision Support System (DSS) is an automated system that provides information on patterns of care on a patient- and provider-specific basis, and which links resource consumption to these patterns. It is both a managerial cost accounting system and a clinical tool that can be used to identify the most cost-effective clinical methodologies. DSS can be used by clinicians, medical center and VISN managers, and VHA executives to support clinical and management decisions, hence its name. Functional capabilities for which DSS data may be used include:

- Budgeting and planning for medical centers and VISNs.
- Resource distribution based on performance.
- Support of managed care.
- Comparisons of VISNs' and medical centers' workload and costs.
- Support of VHA funding requests to OMB and Congress.
- Support of Quality Management functions.
- Enhancement of the MCCR program.
- Productivity analysis and data on patient-specific costs.

Initial development of DSS began in 1986 at the VA medical center in Brockton, MA. In 1994, at the direction of Congress, actual implementation began at 10 VA medical center test sites. Implementation is presently underway[7] at every VA medical facility[8] in all 22 VISNs.

Implementation is a multi-year process. The speed with which full implementation is achieved is highly dependent on how many staff medical center or VISN managers assign to the process, the qualifications of those staff, and how committed local and VISN managers are to DSS. For these reasons and because implementation was initiated in several stages (called "rounds"), different medical centers are at different points in the implementation process.

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[7] *DSS development staff distinguish between "technical" implementation and "operational" implementation. If the software is installed and running on a local computer system, DSS is considered technically implemented. However, it is not operationally implemented until the system is fully populated with the necessary relevant data. Our definition of implementation goes further. We consider a DSS system fully implemented only when medical center or VISN management is actually using the data to make policy decisions.*

[8] *At present there are 147 DSS systems in various stages of implementation. This number accounts for all of the various integrated medical facilities extant at the time of this writing.*

Implementation is being guided by staff of the Implementation and Training Service of the CIO in VHA. However, these staff have no line authority over field staff to enforce either VHA or CIO policies regarding the DSS system or its implementation.

Staffing for technical implementation, maintenance, and training related to DSS is provided by the CIO. Field facilities provide direct and collateral staff to support DSS at the local level. Based on CIO staff estimates and our audit work, we estimate that, through September 30, 1998, implementation costs for DSS were about $140 million. This includes:

- Contractor costs
- Related CIO staffing costs
- Estimated field staffing costs

The audit was undertaken at the specific request of the Under Secretary for Health.

DETAILS OF AUDIT

What DSS Does and How It Works

DSS is an extremely complex system both in terms of its internal mechanics and its underlying principles. With extensive assistance from DSS development staff, we have attempted to provide an understandable, if necessarily simplified, overview of DSS. To avoid unnecessary complexity, we have omitted addressing DSS components and processes that are not directly germane to our audit topic. It may also help to refer to the glossary of DSS terms provided in Appendix VI of this report.

DSS at its most basic level is a managerial cost accounting system[9] that associates costs with the various services, such as laboratory tests, drug prescriptions, clinical procedures, days of nursing care, etc. (referred to in DSS as "intermediate products"[10]), that may be provided to patients at VA medical centers. Of at least equal importance, DSS is a clinical tool that can be used to analyze treatment patterns and to manage patient care. The purpose of DSS is to provide clinical and administrative managers with information about the efficiency and effectiveness of clinical pathways[11] for individual patients and groups of patients. It also provides managers with efficiency and effectiveness information about medical programs locally, VISN-wide, and nationally. Thus, DSS allows managers to make informed decisions about the allocation of VA medical care resources locally, VISN-wide, and nationally.

During the DSS implementation process at a medical center, implementing staff are charged with identifying all the intermediate products produced throughout the medical center and identifying the costs associated with those products. Some cost determinations are partially automated through use of existing VA automated systems *(e.g.*, the Personnel and Accounting Integrated Data – PAID – system and the Financial Management System – FMS). Other cost determinations, (most, in fact) require manual analyses and research into expenditures of staff time by type and amount (nurse,

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[9] *DSS functions both as a job order cost accounting system (in the medical care venue, a patient is regarded as the "job order") and a process cost accounting system (a processing component would be, for example, Radiology Service, Laboratory Service, a bed ward, or some subcomponent of these).*

[10] *As opposed to "end products," which represent the particular patients for whom the services were provided. Many intermediate products (clinical events) contribute to the end product (a patient case).*

[11] *A series of critical steps or events that clinicians determine to be crucial and necessary parts of the optimal management sequence for a specific disease entity that are believed to affect outcome.*

physician, technician, etc.), supply consumption, equipment use, overhead, and so forth for each of the hundreds of intermediate products that any VA medical center may produce. Some of these cost types are also classified as either fixed or variable.

During DSS implementation, medical center staff must create Relative Value Units (RVUs) to identify the relative amount of costs, for a given cost type and category, that each intermediate product consumes within a production unit (department). If a clinical procedure takes 10 minutes of physician time to complete, the physician RVU for that procedure is the percentage that the 10 minutes represents of the total physician time that is mapped to that production unit.

Account Level Budgeter Cost Centers (ALBCCs) represent the smallest production units in a medical center for which costs and staff time can reasonably be apportioned. Medical center staff must identify their facility's ALBCCs and determine the costs each one consumes. Normally, such activities as a cardiac catheterization unit, an ultrasound function, or individual specialty clinics represent separate ALBCCs. The portion of the costs that each ALBCC uses each month is mapped to that ALBCC from VA's accounting records. In the Department Cost Manager (DCM) component of DSS, workload is combined with these established costs to determine the cost of intermediate products. See the graphic on page 20 for a simplified view of this process.

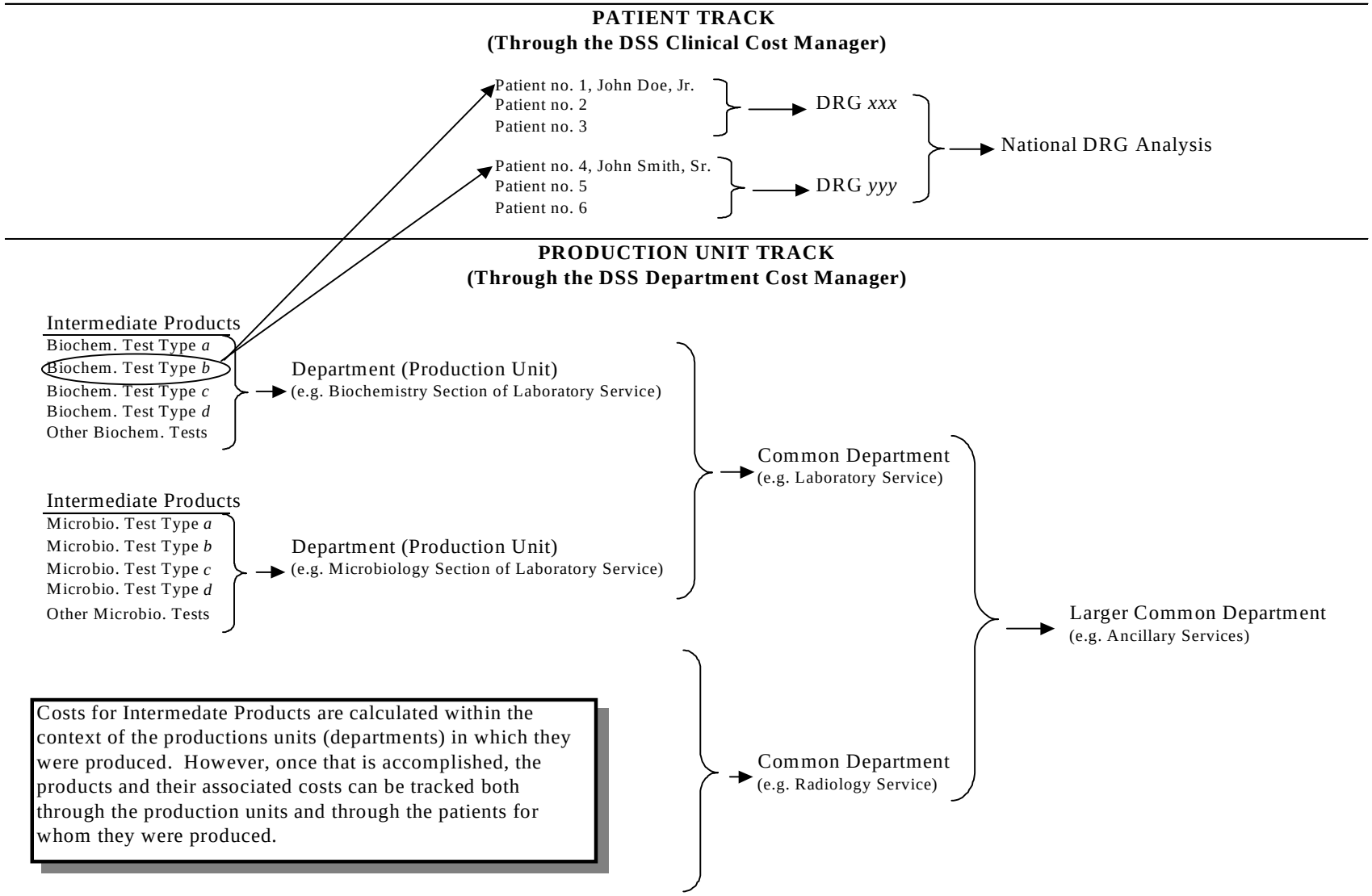
Once the costs of intermediate products are determined through this process (monthly recalculations occur automatically because of changes in workload and other factors that impact production costs), these costs can be tracked across both:

- The production units in which they were produced and any larger organizational components ("common departments") with which they may be associated. (In management accounting jargon, this is referred to as "process cost accounting.")

- The patients for whom they were produced and any larger groups to which these patients may be related, such as Diagnosis Related Groups (DRGs). (This is referred to as "job order cost accounting.")

This allows managers to analyze costs for either patients and groups of related patients or production units and groups or related production units. The graphic on the following page illustrates this.

DSS Data Flow By Patient or Production Unit



DSS allows for the presence in a medical center of workload that cannot be associated with discrete costs. Almost all VA medical centers have some workload that is not specifically identified, *i.e.,* not "captured." In DSS, costs associated with uncaptured workload are allocated to a DSS department set up specifically for that purpose, Department 5WW1. Costs associated with this uncaptured workload are then "spread" across all patients and production units as if they were "overhead." The amount of uncaptured workload, and attendant costs, varies greatly from medical center to medical center depending on the degree to which automated systems have been created to identify and quantify certain kinds of workload.

DETAILS OF AUDIT

Failure To Adhere To the DSS Standard Model Reduces DSS Usefulness for Local, VISN, and VHA Headquarters Users

DSS data is intended to be used for decision making purposes by clinicians and managers at various levels within VHA: local clinicians, local management, VISN management, and VHA top management. To maximize the accuracy of the data and to ensure its maximum usability at all of these levels, each medical center's DSS system must adhere to certain structural standards.

Because of this need to ensure certain basic standards in the implementation of DSS and to assist local staff in that implementation, DSS developers created and distributed a DSS template. With two limited exceptions, this template recommends that ALBCCs (Account Level Budgeter Cost Centers) correspond to DCM (Department Cost Manager) departments on a one-to-one basis. The two exceptions involve the use of Department 5WW1 for uncaptured workload, discussed previously, and the use of one department to cost workload performed by two or more very small and closely related production units.[12]

DSS development staff informed us that adherence to this model ensures both DSS' flexibility and consequent utility at the local level, and the accuracy and usefulness of aggregated data rolled up to higher management levels. It permits local clinicians and managers to analyze their operations at a micro-level (each of the hundreds of intermediate products), if they choose. More importantly, by maintaining narrowly-defined and discrete production units (one ALBCC to one corresponding DCM department), the model facilitates macro-analysis by allowing these production units to be grouped into any set of default or "virtual" common departments a manager might want (see graphic in Appendix III). In addition, use of the model helps ensure that intermediate product costs are as precise as is reasonably possible and that data rolled up to VISN and VHA Headquarters levels represent the same activities from all the contributing facilities.

The model requires that DSS departments reflect the actual organization of work at the production unit level in the medical center regardless of the medical center's organizational structure or its medical care delivery structure. This is key to the accurate

[12] *A simple example of this would be combining into one DSS department the workload and costs from two different, but diagnostically related, low-volume psychiatry clinics that each meet only once per week. DSS developers felt that, in such cases, local management might properly opt to consider resource use for both clinics as a single unit.*

costing of the intermediate products generated within the production units. If a medical center defines its DSS departments in a way that is greatly divergent from the model, its product costs will not be comparable to those of other medical centers and data aggregated from multiple facilities will not be as meaningful as otherwise would be possible. According to DSS development staff and contractor staff, DSS departments:

- Should not be so large that they obscure the components that make them up. (Ideally, with only a few exceptions, each department should contain cost data from only one cost center and workload data for only a small number of related medical care products. The larger the department, the greater the dollars that have to be allocated among a yet larger number of intermediate products. This tends to "spread" costs across products, thus, negatively impacting precision.)

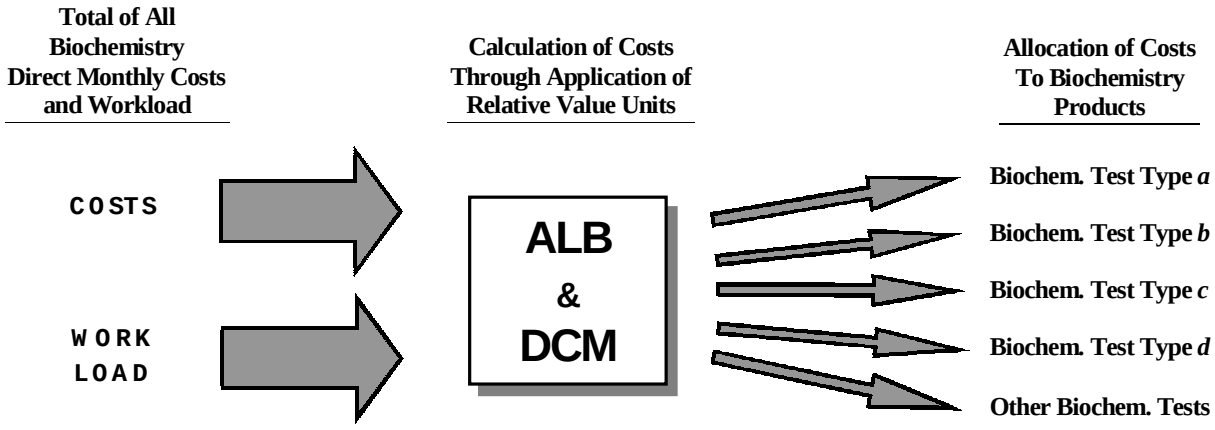
- Should not include costs for both captured and uncaptured workload. (If mixed together, costs associated with uncaptured workload are inevitably averaged into captured workload, thus, unnecessarily distorting the overall costs associated with captured workload.)

- Should not mix both inpatient and outpatient workload and costs. (VHA top management needs to be able to distinguish between inpatient and outpatient related costs for reporting and budgetary reasons.)

Costs for intermediate products are calculated within the context of the production unit (department) in which the products are produced. DSS takes monthly cost center data provided by various existing VHA data systems (*e.g.*, FMS, PAID, and CMR[13]) for a particular production unit; based on monthly workload data for that unit, DSS allocates the production unit's total costs to each of its various products. The process involves calculating Relative Value Units (RVUs) for each of several kinds of costs. Among others, these costs include variable labor for physicians, nurses or technicians, fixed direct labor, variable supplies, and variable equipment. The processes in DSS that perform this function are the Account Level Budgeter (ALB) and the Department Cost Manager (DCM). The exact process by which DSS calculates and allocates production unit costs to particular products is complex and beyond the scope of this audit. However, the following graphic illustrates the process in simplified form:

[13] *FMS – Financial Management System; PAID – Personnel and Accounting Integrated Data; CMR – Consolidated Memorandum Receipt.*

Determination of Intermediate Product Costs



Key to obtaining useable precision in calculation of product costs is keeping the size of the production unit small; the smaller and more closely related the products are to each other, the better. We found that, contrary to the DSS model, some medical center DSS staff opted to create DCM departments that contained multiple ALBCCs. This effectively reduced the precision of intermediate product costs, eliminated any flexibility the system would otherwise have for arranging and rearranging production units into reporting units, and complicated any analysis local managers might have performed on the subcomponents of their operations.

At one facility, we found that DSS staff had combined all mental health activities into one large DSS department so that, for example, outpatient substance abuse and post traumatic stress disorder treatment were combined into the same department with inpatient treatment of schizophrenia. While this action did not prevent cost analyses of a generalized "psychiatry program," it did complicate detailed cost analyses of any of the components of that program. In addition, DSS development staff told us that it would prevent VISN and VHA managers from making similar assessments that could impact the allocation of psychiatry resources at that facility or within the VISN. It also reduced the precision of costs associated with all the intermediate products produced in the psychiatry program.

DSS medical center staff told us that this was done to allow their local clinicians, not expert in using DSS, an easy way to analyze their total psychiatry operations. The large DSS department reflected the facility's actual organizational structure where all mental health activities represented one product line under one manager. These DSS staff told us that they believed DSS reports were more useful to local managers when all the activities under the manager's control were combined into a single DSS department.

While combining numerous intermediate products into one DSS department may simplify macro-analyses of large operations by non-expert users, we agree with DSS developers that it effectively negates one of DSS' most powerful features, its flexibility. Because workload and costs for discrete production units are obscured in such a large department, they cannot be broken out and re-arranged as needed. On the other hand, adhering to the basic DSS structure produces a series of basic building blocks. Each small, unique building block represents a discrete intermediate product that can be assembled with others into virtually any arrangement that a manager chooses, disassembled at will, and reassembled into other configurations as needed.

We witnessed a demonstration of just this process. It was performed online, in real time, with live data from a real medical center. It took mere seconds to reassemble several, relatively small production units into temporary (as distinguished from permanent or default) "reporting units" or "common departments." Refer to the graphic in Appendix III for a view of the process of grouping production units into common departments. While that graphic does not illustrate the process of temporarily establishing a common department for a one-time analysis, the concept is the same.

The process of regrouping production units into temporary common departments is impossible if the production units are not discretely identified, as was the case at one medical center we visited. The accuracy and usefulness of roll-up reports to VISN and VHA Headquarters levels can be further negatively impacted if large departments also mix inpatient and outpatient workload and mix costs for captured and uncaptured workload.

VHA Headquarters officials, in particular, require data to be reported separately on inpatient and outpatient workload. They need to be able to distinguish between inpatient and outpatient related costs for reporting and budgetary reasons. In addition, if large departments happen to also combine costs for both captured and uncaptured workload, then there is no point in trying to capture and cost specific workload. This is because the specific workload will be obscured by the inclusion of uncaptured workload costs.

DETAILS OF AUDIT

Local Use of DSS Data Versus VISN and VHA Headquarters Use

Based on extensive interviews with field DSS staff and local and VISN users of DSS data, we concluded that there exists, at some locations, a significant gap between their understanding and that of Chief Information Office (CIO) staff of the purposes and capabilities of DSS. We believe this has contributed to decisions made by staff at some medical centers to not adhere to the standard DSS model structure.

Some medical center staff told us that they wanted to tailor their DSS structures to correspond to their individual organizational structures and ways of delivering care. We found this especially common of staff at facilities that use certain non-traditional forms of managing the delivery of medical care (*e.g.*, "product line" management). Even though contradicted by DSS development staff, the medical center staff believed that it was either necessary or desirable to construct their DSS structure to mirror the medical center's organizational structure.

Further, a few field DSS staff believed that they had a proprietary right to build their DSS structure in any manner they wished. It may be that, because their own facilities provided the staffing for DSS implementation, they believed that they had the right to structure their systems in a way they perceived as most useful to them.

Some field DSS staff whom we interviewed demonstrated a lack of understanding of the information needs that VHA Headquarters staff have. Some did not seem to realize that their non-standard DSS structures could negatively impact data rolled up to higher management levels. Others expressed a fear that VHA Headquarters officials could or would use DSS information to micro-manage their facilities.

On the issue of whether DSS was even capable of simultaneously meeting local, VISN, and VHA Headquarters needs, we observed differences of opinion among local DSS staff and between local staff and DSS development staff. DSS development staff demonstrated adequately that neither local information needs nor VHA Headquarters' information needs would have to be sacrificed if medical facilities adhered to the standard DSS model. While we accept that DSS is, in fact, fully capable of satisfactorily meeting local, VISN, and VHA Headquarters needs, we observed a wide diversity of opinion on this issue.

- Some field staff expressed the belief that local utility would be sacrificed if their DSS systems were structured to accommodate upper management data needs. These staff were generally opposed to making any such perceived sacrifice.

- While other field staff conceded the need to provide accurate data to VISN and VHA Headquarters officials, they believed that system compromises, over an extended period of time, would have to be made to achieve this goal.

- A few field staff expressed the belief that, given the nature and number of individual DSS systems that feed local data into national roll-up reports, accurate national summary reports would never be possible.

- Many DSS field staff went so far as to suggest that VHA Headquarters officials should not use such data to compare performance among medical centers, because VA facilities cannot be legitimately compared with each other.

We believe that all of these positions were based, to some extent at least, on a fundamental misunderstanding of the capabilities of DSS or the need for accurate DSS-type data at upper management levels in VHA.

GLOSSARY OF DSS RELATED TERMS

Included in this glossary are DSS-related terms of two types. Underlined (and shaded) terms are those that relate to issues discussed in this report. Others, those not underlined, are included only to provide the reader with a better understanding of various aspects of the DSS system, particularly its capabilities. All of the following definitions are quoted from literature provided to us by DSS development staff.

Account Level Budgeter (ALB) — A financial subsystem of DSS used to develop a comprehensive hospital budget and record actual expenses at the account, job code, and employee level of detail.

Account Level Budgeter Cost Center (ALBCC) — A locally defined organizational unit where costs are identified in a practical manner in terms of labor, supply, and capital costs and are aggregated at the production unit level.

Activity Modeling — The process of modeling changes in patient activity (case volume) and intermediate product utilization per case. Activity modeling allows the user to project changes in department cost and workload based on changes in patient activity and utilization.

Activity Summary File — A file that stores summarized patient data organized according to a user-defined roll-up structure.

Allocation — The templated process within DSS of distributing an organization's indirect costs across multiple departments.

Budget — Within DSS, the plan of operation for the coming year, expressed in quantitative terms. The budget offers a standard against which actual performance can subsequently be measured.

Case Mix — The weighted classifications or categories of patient cases treated in a hospital, based on Health Care Financing Administration (HCFA) Diagnosis Related Group (DRG) weights.

Clinical Budget Protocol — A projection of the desired or estimated number and type of intermediate products used to treat different types of patient cases.

Clinical Cost Manager (CCM) — A module of DSS that provides revenue, cost, profitability, and utilization for each patient encounter and provides tools for analyzing user-defined subsets of patients and services.

Clinical Financial Planner — A module of DSS that provides modeling functions for budgeting, strategic analyses, and competitive bidding. A hospital can model changes in clinical activity, cost, and reimbursement.

Clinical Indicators — Measurement of important aspects of health care delivery processes or health outcome for a specific patient cohort.

Clinical Pathways — A series of critical steps or events that clinicians determine to be crucial and necessary parts of the optimal management sequence for a specific disease entity that are believed to affect outcome.

Clinical Practice Guidelines — A consensus by expert clinical panels concerning the appropriate health care, inclusive of diagnostic and therapeutic procedures, for patients with specific medical conditions.

Cohort — A group of patients, followed over time, that is clinically defined by disease, demography, or risk factors.

Common Departments — A predefined structure for department grouping used for the corporate roll-up and Activity Summary Files.

Component Roll-Up Structure — A roll-up structure where the fields defining each level are not the same across the structure.

Continuum of Care — Care delivered, over time, to a patient comprised of individual episodes of care, both inpatient stays and outpatient visits.

Controllable Cost — Cost which can be significantly influenced by the actions of a manager.

Corporate Roll-Up — A roll-up structure used to combine summarized patient information from multiple facilities into one summary file for use in reporting and comparative analysis. The corporate roll-up requires the use of common departments and an identical roll-up structure for each facility.

Cost Category — A subset of the cost type variable labor used to assign costs for employee groups to intermediate products. Valid VA cost categories are:

Allied health care personnel and technicians	VL1
All nurses (RNs, LPNs, and aides)	VL2
Physicians, residents, and psychologists	VL4
Contract labor	VL5

Cost Type — The first level of cost classification. Valid VA cost types are:

Variable labor (VL)	Fixed direct labor (FDL)
Variable supplies (VS)	Fixed direct equipment (FDE)
	Fixed direct other (FDO)

Cost Variance — The difference between actual and budgeted costs.

CCM Payors — A DSS identifier for a patient revenue source, used to model reimbursement.

CPT Codes — *Current procedural terminology* codes are the uniform descriptive terms and identifying codes for reporting health care services and procedures performed for outpatients.

Daily Cost and Resource Profiler (DCR) — A module of DSS which provides a tool for analyzing individual and group utilization details for each day of patient stay, for analyzing responsibility for utilization, for analyzing physician practice patterns, and for introducing user-defined perspectives to daily utilization analysis.

Decision Support System (DSS) — A secondary relational database that integrates financial and clinical information extracted from Veterans Health Information System and Technology Architecture (VISTA) packages and the Austin Automation Center clinical and financial files.

Department — An organizational unit in which a manager has clearly defined areas of responsibility and over which he or she exercises control, a distinct intermediate product line, and a discrete labor pool.

Department Cost Manager (DCM) — A cost accounting module in DSS, which focuses on controlling costs and improving productivity at the department level. DCM retains budget and actual volumes (workload), costs, and hours for facility departments.

Diagnosis Related Group (DRG) — A patient classification scheme that groups inpatients into clinically similar groups.

Direct Costs — Costs directly associated with providing patient services.

Direct Departments — Departments that provide services directly to a patient (*e.g.*, nursing wards or radiology).

Division Code — An indicator, contained in the patient encounter record for multi-divisional facilities, that indicates which division treated the patient. In the ALB and DCM, the numbering scheme for ALBCCs and departments allows the facility to separate costs by division.

DSS Identifier — Previously called a "stop code," a three-digit number that identifies the type of outpatient services provided to a patient.

Encounter — A record of an inpatient stay or outpatient visit that includes clinical, demographic, and utilization information related to the stay or visit.

End Product — The treated patient case or encounter. Each patient case is produced using different quantities and types of hospital intermediate products or procedures and services.

Episode of Care Study — Analysis tool that provides a longitudinal view of a patient's full case experience.

Event Capture System (ECS) — A VISTA application that allows users to collect patient data not being captured by other packages.

Fixed Cost — Cost that do not vary in direct proportion to the volume of patient activity. The word "fixed" does not mean that the costs cannot be changed, but rather that they do not change as a result of volume.

Flexible Budget — Within DSS, a budget that reflects standard costs adjusted for the actual volume and mix of products produced.

Histogram — A graphical representation of a frequency distribution.

ICD-9 CM Codes — *International Classification of Disease, 9th Clinical Modification.* A standardized classification of disease (diagnosis) and procedure codes for uniform billing of inpatients and outpatients.

Indicators — Measurements of expected and unexpected aspects of care delivery that impact quality, satisfaction, or functionality of the individuals receiving care. DSS permits the use of indicators by allowing the user to build special indicator fields on patient records.

Indirect Costs — Costs not directly related to patient care, that cannot be specifically traced to or identified with an individual patient or group of patients. These costs are allocated to direct departments through the indirect cost allocation process.

Intermediate Product Department (IPD) — A department that produces intermediate products, which are the procedures and services provided for the patient. Also known as direct departments.

IPD Groups — User-defined groupings of clinically similar departments.

Job Order Cost Accounting — Accounting methodology where the cost of the whole is equal to the sum of the cost of its parts. In DSS, job order cost accounting is applied to the patient database. The cost of a patient stay or visit is equal to the sum of the cost of the products used to treat the patients.

Large Case Type — A user-defined field which groups clinically similar patients.

Longitudinal Case Study — Follows individual patients or groups of patients across a continuum of episodes of care allowing analysis of process and outcomes over many in-and-out patient episodes.

Major Diagnostic Group (MDC) — A classification system grouping DRGs of related diagnoses, typically grouped by body system (*e.g.*, nervous system or circulatory system). Each MDC is further divided into a surgical and medical section.

Model 204™ Region (M204) — The programming language for the DSS software. Model 204™ resides at the Austin Automation Center and has individual DSS regions established for each VISN. Within the region, users may be granted access to data for one or more facilities.

Modeling — A technique for simulating the effect of various conditions that may occur in an actual situation, and then making well informed forecasts.

Modeling Assumptions — A use-defined change to an original value used in the modeling or budgeting process. Assumptions may be created at the account, job code, or employee levels. These assumptions may then be applied to the modeling base.

Outliers — Cases that exhibit a significant deviation from the population mean or average. The DSS system automatically defines a length of stay outlier as any case exceeding the HCFA length of stay cutoff.

Patient Assessment File (PAF) — Patient database residing in Austin that contains the resource utilization group (RUG II) assignments for all VA long-term care patients.

Patient Service Lines — An organizational schema used to identify the patient population serviced and to provide a coordinated continuum of care that adds value and contains costs.

Patient Treatment File (PTF) — Principal source of inpatient workload data. It is a computerized abstract of every inter-hospital transfer and every patient discharged from a VA facility.

Phase of Case Study — DSS tool used to analyze and compare encounter utilization by clinically significant segments or phases, based on the concept that for similar cases, major interventions or therapies occur in specific sequence but not necessarily on the same day.

Product Line — *See Patient Service Lines.*

Relative Value Unit (RVU) — Weighted units of measure that allow for the relative comparison between different complexities and mixes of procedures. RVUs take into account the differing amounts of input, such as labor or materials, required for different procedures.

Roll-Up Structure — A user-defined structure that dictates how patient data will be summarized in an activity summary (ACTSUM).

Standard Cost — A measure of expected cost based on the budgeted volume and dollars.

Temporal Indicators — Relationship between two or more events which are monitored for sequence and timing.

Tool Kit — A reporting module within DSS used to query the database through user-defined reports.

Total Cost — The direct cost of providing a service, plus some allocated share of any indirect costs incurred. Total or full costs can also be defined as the total financial requirements of an organization.

Variable Cost — Costs that vary directly and proportionately with volume. Many direct costs, such as supplies are examples of pure variable costs since they increase in direct proportion to the number of services performed. *See also Fixed Costs.*

FULL TEXT OF UNDER SECRETARY FOR HEALTH COMMENTS

Department of Veterans Affairs

Memorandum

Date: MAR -2, 1999

From: Under Secretary for Health (10/105E)

Subj: OIG Draft Report: ***Audit of VHA's Decision Support System Standardization***

To: Assistant Inspector General for Auditing (52)

1. The referenced report has been shared with appropriate program offices and their comments have been incorporated into this response. There is consistent agreement with all of your findings and recommendations, including the Management Advisory, and the attached action plan details the steps we are taking to address the issues you target. I understand that you have agreed to provide a footnote in the final report to clarify your intent in broadly citing the total DSS program costs through September 1998 (i.e., $140 million) as a "better use of funds" estimate. Based on the explanation supplied by your auditors that DSS will fulfill its potential (and therefore justify program costs) when VHA successfully implements our agreed-upon action plan, we also concur in your statement of monetary benefits.

2. The Offices of the Chief Network Officer (CNO), the Chief Financial Officer (CFO) and the Chief Information Officer (CIO) have committed to working in close coordination to ensure that DSS achieves its full potential as a critical management tool. We recognize that the integrity and viability of the system rely heavily on the basic tenet that all facilities adhere to the core DSS structural model. We also support the need for our facilities to universally apply the Event Capture System (ECS) to accurately account for previously unrecorded workloads. Guidelines highlighting these premises have been widely distributed systemwide, but, as you report, notable divergences continue for a variety of reasons. We agree that careful monitoring of facility compliance is needed and that universal application of established controls should be initiated. In addition, the justification for any divergences from the core model must be clearly validated.

3. We anticipate that the recently established DSS Steering Committee will play a pivotal role in designing and overseeing a detailed plan of DSS system standardization. As you know, committee membership is comprised of staff from the key Headquarters offices, as well as from the VISN Offices and medical facilities (including a DSS Site Manager). The Committee is familiar with your report, and members have already discussed improvement opportunities during scheduled teleconference calls. They have initiated actions to develop a comprehensive plan to address the issues that you

VA FORM MAR 1989 **2105**

FULL TEXT OF UNDER SECRETARY FOR HEALTH COMMENTS (Continued)

Page Two OIG Draft Report: **Decision Support System Standardization**

have identified. In April 1999, the Committee will convene a face-to-face meeting to finalize the implementation plan prior to submitting for final approval by VHA top managers. A status update will also be provided to OIG. In addition, a copy of the final report, including VHA's official response, will be transmitted to all VISN Directors. Every effort will be made to assure that all operational levels are primed to implement recommended corrective actions.

4. Thank you for the opportunity to respond to this report. Your efforts have been very helpful in assisting us to confirm priority areas that require renewed attention. If additional assistance is required, please contact Paul C. Gibert, Jr., Director, Management Review and Administration Service (105E), Office of Policy and Planning (105), at 273.8355.

(Original signed by)
Kenneth W. Kizer, M.D., M.P.H.

Attachment

FULL TEXT OF UNDER SECRETARY FOR HEALTH COMMENTS (Continued)

Action Plan in Response to OIG / GAO / MI Audits / Program Evaluations / Reviews

Name of Report: OIG Draft Report: ***Audit of VHA's Decision Support System Standardization***
Report Number: Project No. 7R4-437
Date of Report: n / a

Recommendations / Actions	Status	Completion Date

Recommendation 1

In order that DSS can achieve its full potential, the Under Secretary for Health should:

a. Ensure that all staff and managers involved with DSS understand the necessity of maintaining local DSS systems in adherence with the basic DSS model.

Concur

As specified in the DSS VISN audit guide, all VISNs should have documented action plans for maintaining their local DSS systems. These plans should reflect the fundamental structural guidelines that have already been disseminated throughout the system by both the Chief Information Officer (CIO) and the project contracting staff. DSS Site Managers play a critical role in effective implementation of DSS and they should be responsible for implementing the VISN action plans and acting as liaisons with facility management in regularly assessing the overall functioning of DSS, including the value of generated reports and identification of improvement opportunities. Input from the Site Managers should then be communicated on a regularly scheduled basis through the VISNs to the Chief Network Officer (CNO) and CIO, and, subsequently to the DSS Steering Committee. We share OIG's concerns that these guidelines are not being consistently followed by all facilities and are taking immediate steps to address the problem. As emphasized throughout our response, the DSS Steering Committee, in close coordination with the offices of the CNO, CIO and CFO, will be the pivotal oversight body in monitoring VISN / facility compliance with established guidelines. Steering Committee members, which include representation from the key program offices identified above, have already thoroughly discussed all of the issues identified in the report. The Committee has agreed to design and oversee a detailed implementation plan of corrective action to ensure that all facilities adhere to a baseline DSS structural model. Standardization will not detract from the built-in flexibility of the DSS product to permit realistic variation inherent in each facility.

FULL TEXT OF UNDER SECRETARY FOR HEALTH COMMENTS (Continued)

When they convene for a face-to-face meeting in April 1999, DSS Steering Committee members will coordinate their implementation plan of OIG recommendations to be communicated to key Headquarters and VISN managers, including the Under Secretary for Health. The action plan will also be provided to the OIG, with periodic status updates as requested.

In the meantime, a copy of this report, including VHA's formal response and action plan, will be provided to all VISN Directors, who will share with their facilities specific expectations in addressing identified issues.

In Process May 1999 and Ongoing

b. Periodically determine the degree of adherence to the DSS structural model that is required of medical center systems.

In defining their implementation plan for OIG recommendations, the DSS Steering Committee will identify ways by which they can effectively monitor levels of overall compliance by the facilities in adhering to the DSS structural model. When a questionnable level of divergence is identified, documented justification for the differences will be requested. Steps in the monitoring process will be identified at all three organizational levels. In particular, the Committee will assess the utility of the various reports that are currently being generated and make specific recommendations about what revisions, if any, are indicated to enhance the value of the system in assisting management decision-making.

In Process May and Ongoing

c. In coordination with the Chief Network Officer, establish the controls (i.e., incentives and consequences) necessary for full compliance with decisions made under Recommendation 1b.

Concur

Actions planned in response to this recommendation are linked to those described under Recommendation 1b. The DSS Steering Committee, which includes

FULL TEXT OF UNDER SECRETARY FOR HEALTH COMMENTS (Continued)

Page Three VHA Action Plan in Response to OIG Draft Report: **DSS Standardization**

representatives from the offices of the CNO, CFO and CIO, will recommend for systemwide implementation what they consider to be the most effective incentives/consequesces in achieving DSS standardization goals. Details of the Committee's action plan will be shared with the OIG in a status update report.

In Process May 1999

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MONETARY BENEFITS

IN ACCORDANCE WITH IG ACT AMENDMENTS

Report Title: Audit of Veterans Health Administration Decision Support System Standardization

Project No: 7R4-437

		OIG ESTIMATE		AUDITEE ESTIMATE	
Rec. No.	**Recommendation**	**Questioned Costs**	**Recommended Better Use of Funds**	**Questioned Costs**	**Recommended Better Use of Funds**
1.	Ensure the effective utilization of funds expended on DSS by causing it to fulfill its potential.				
		-0-	$140 Million[14]	-0-	$140 Million[14]
	TOTAL	-0-	$140 Million	-0-	$140 Million

[14] *There is no implication that the $140 million spent on DSS was in any way "wasted." Indeed, we say in the report that DSS is an information system of potentially major value to VHA clinicians, managers, and executives. Our point in citing the monetary impact is that the steps we recommend, which VHA agrees with, are necessary for the system to fulfill its potential and to insure that those funds were well spent.*

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This report will be available in the near future on the VA Office of Audit web site at http://www.va.gov/oig/52/reports/mailist.htm *List of Available Reports*.

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